



#110

Rec'd PCT/PTO 07 OCT 2003

SEQUENCE LISTING

<110> Bayer Aktiengesellschaft

<120> Nucleic acids coding for enzyme activities of
spinosyn biosynthesis

<130> Le A 33 955

<140> US/10/069,353

<141> 2000-08-17

<160> 55

<170> PatentIn Ver. 2.1

<210> 1

<211> 50000

<212> DNA

<213> Saccharopolyspora spinosa

<400> 1

```
ggcaccaccc cggggccccc gctcactcg gactcgatcc gcattccggt caccgaacatg 60
tgaccgcgtcg agtgcggtgat cattagctcg gtcttcgctt cgatcgccgc ctgctgcggg 120
gtcacgccgc agcccagaa caccggcacg tcgcccggct ccatacgcac tcgttcaccc 180
cagtcagggt catcaacggt gtcgatgccc aacttctcag gggagccgat gtgcacgggg 240
ccccgtgca cctcgggatg cgcagcggtg atggtgacag cctccgccac ccggtccggg 300
ggcatgggac gcattgaaac cactagcttc ccccggaact ggctgcggg cacacactca 360
cggttgctga ggtaaaccgg gccgttgatc cctgggtcga tgtgccggat cgggagtcgg 420
gcatcgagca gcaagtgtc gaaggagaag ctgcagccaa gcaggaacgc gaccatgtcg 480
tcgggtccaca ggtcaacgac gtcactgcgc tctccacca gcgcccttc ccggtacacg 540
ctgtatttgg gcaggtcggg gcggaggtca gcaccagggg cggtcagctt cggctccgga 600
tctcccgct cgggtgacctc gaggatcggg caccggttgg ggttcgctg ggcgaaccgc 660
atgaagtcca acgcgtcatc ctggggcagc atcacgaggt tggcctgcac gaatccatga 720
cagatcccgg acgtgggcct cgcccacgca ttcgcgcggg tggcacgcca tgcctcgatg 780
ggctccgct gctgcagatc aacgaactcc atcgatgact tccccttccc ggcgatgatg 840
acgaaggctg gcaaccgagg gttgcccgct acgggtggcc gtcactgggtc tgccaccacg 900
gggtcgccga gcaggctctg gtgaacgatt ccggagatca gtcggcatg cgcggcgacg 960
aaacgcagtg ggatcccgtc gtgccttgg aacgcgggat cgtcaacgcc gccgctgctg 1020
agacctgcgc gcagcccag ctcggtccac tcgcgcacca gatccccggt gactgccagg 1080
tttgccgctc gagccaggat ggccaccgca ccggtgatga cgtagcagcc caaatcgac 1140
acggatgcag gcagcagatc atccaccgtc gtggacgcga agaattccgc ctcaacgctg 1200
acgcctcgcg gactcagcgc ctcggactcg gcggcaatgt tgccgaacct gatctcggtg 1260
ccgttgtctc ccacggccag cgtcagagca ccgttgtccg tggcggcgcg aaggtagtctg 1320
tcggcaaaca gatcaccggc ggtgaccggc gtgcccaga tcagatgacg gccgccaaca 1380
gagttctgcc ccagcttctc gatggcggcg acgacgccga actgcgccgc gaactcccgg 1440
gcctcggccg cgctggagaa tcgggactcc atcaaggtca cgccatccag gcccgacgag 1500
tcgaccagct tctccaccgg gccgacggcc tctgggtcga tgacgatggt cacctcgcta 1560
ccaagaccgg cgagcgtgcg cgcgagtgcc agagagccga tggggccgct cacctcccc 1620
tgccgggaacc ggcttctc gaccagacct gtgacgatca acgccttttc accctgtcga 1680
cgcagcagag agcgcgcgat cgcaaggctg atcggtccg accgctcacc ccgcgccagc 1740
gtgtagaacg ggctcacgat gccggccggg ctcgtcggcg gacgcatctc gatcgtggcc 1800
agtcgatcca ggctctcgaa ggccgggtgc gactcgggct tcatcagctc tccctcggtg 1860
tacgacatat cccaaggact tcatccgcta cggagtcccg cctcggggcg ttgcttacgc 1920
ggtgaggacc atataccgta ttccactgtc caaggaaggg ggacgatgga accgaatcag 1980
ccacgcactg cgggcacgct gaacatggtg gagctgcacc atcgcccagc cgccgcagac 2040
tccgcggtgg ggtccggcaa cggatgctc gcacccctcg acgcacgcgt cgacaatctg 2100
```

acagatcggg	tcttcgaggg	catccgcgac	agcatcgtaa	gtcaggcact	cccacctggg	2160
cgtcgtgtga	gcgaggccaa	gctcgcggcc	gagctgaatg	tcagcaagac	ccccgtgcgc	2220
gaggcgcttc	tccgcttgcg	gcacgtgggc	ctggctcgagg	ctgccccgaa	ggggctgcgc	2280
gtcatcagcg	cctcgggtccg	cgccattcgc	gacgcctacg	agcaccgggc	ggggctggag	2340
agctcggcag	cctgggttcac	cgcacatcgg	gctaccagcg	cccaacggga	gaggctccac	2400
gaggctcgcca	cctcatccct	gcgcgcggca	gagtcggcg	actccgccca	gttcgcgcgc	2460
gaggatcgcg	tcttcaccca	catcatcgcc	gagttctgcg	ggaacgagat	cctccagcgc	2520
gcggctcgaca	acgccttggg	gctgaccgct	gtactccgag	aacgcgacac	tccctcgacc	2580
ggtgactcca	tctcctgcgc	ctcggagcac	atcgcgacgg	catccgcctg	tctggctggc	2640
gacgcgcgacc	gggcagcccg	gaacaacgcc	gaccacatcc	tccacgtgat	gtcgtctgtc	2700
ctctcctcac	acacgcagcg	cgggaaacgtg	cccccgggaa	cgagttaaac	caactcccc	2760
acccctacc	tcaccattcg	accgaaggac	gggctttcgt	gaccgagcac	ctggcgacca	2820
tcaccgctgc	ggaaggagag	atccccgttg	tctgtagcga	ccgcggcgtc	gcagcaatcc	2880
gggagataga	ccccgagctg	gcgggtcacga	ccatcatgga	cgtgatcgca	ggagaccacc	2940
tcgcgcggct	gcgtgagcgt	gtcaagaacg	cccccgacct	cgcttcaca	cgctggacg	3000
aggtgcgggt	caccgcgcgc	taccgatccc	cccggaagat	ctggggcatc	ggtctgaact	3060
acggcgatca	cgcagcggac	ctgagcgagt	cggcgcccga	ccagccggcg	tccttcgtga	3120
agtgcgacca	cacgatcatc	ggcccggatg	agccgatcgt	gattccggcg	cagagtgagc	3180
gcaccacgtc	cgaggctgag	atcgggctca	tcacggcgag	gacttgcgag	aacgtcagcg	3240
agtccgaggg	gatggactac	gtgtgggggg	tcacgacct	cctggaccag	accgcggagg	3300
acatcttgcg	gatcaatccg	cgctatctca	cccgtccgaa	gaacttcggg	acgttcttct	3360
gcttcggacc	ggagctcgta	ccgtctgatg	aggtgataga	gaagttcgaa	agcttgagcg	3420
acatcgagat	ctcgacggtc	aagaacggcg	atgagttcag	gaccaacacg	gtcgcgccaca	3480
tgaccacaaa	gcccgcaccg	ctcgtgagct	tccactcgaa	gatgatgccg	ctgtttccgg	3540
gagacatcat	ctccaccgga	acccctggcg	cgctcgtcat	cggcgacgga	gaccgtgtgg	3600
agtgcgggat	cgacggcctc	ggtcagctga	ccacgacggc	gcgaaaggcc	actacagat	3660
gagcactcac	cggttcgagc	agctcgaccg	gaccgactc	ctgcaatgtg	ccgacgacct	3720
ccgcgagacc	gtcctcgagc	acgcactcaa	gggctgtccc	ctgggtgtct	gtgtgtcct	3780
cggagaggtg	gaccagcaga	actggaacgt	ggcccgcgga	gacctcgccc	tgccggtgac	3840
cacactccac	gcacgcgcta	tgaacgcca	cctggcgact	atggaggcgt	actgcgagcg	3900
caacaacgcg	cttctcgccc	cgcacggcaa	gaccaccatg	tcaccccgag	tcttcgcctt	3960
tcaggcgctc	cacggtgcgt	ggcggttcac	ggcagcgacg	ccactcagg	tggccgtgat	4020
gcgcgcgtac	gggggttcagc	gcacatcct	ggccaacgaa	ctcgtcgatg	ctccgcgct	4080
gcgttggggtg	actgccgaaa	tcgccagcga	cagctcgttc	gacttctact	gcctggtcga	4140
cgatgcggac	acggtgcggg	cgatgtccga	taccatcgcc	gactccggcc	acggggtcac	4200
cctcaacgtc	ctcctcgagg	tcggagtgcc	tgggtggcagg	tgtggcgctg	gagacctcga	4260
ctcggcgctc	gaggtcgccg	cggcggtcgc	cgcgaccgag	catctccggc	tggctcggcgt	4320
cgaggcctac	gagggcctcg	tgaccggcgg	catgacaccg	gaggacctcc	atgcactcga	4380
caccttcttc	gctggcgctc	ggtcgatcgt	gctcgagctg	gcacgtcgcg	acctgttcga	4440
cgccaaccgc	atcatcgtga	cggcaggcgg	aagctcgtac	ttcgatcgtg	tcgtcgcccg	4500
actcggctcg	tgggacgggtg	tcgcgcacga	cgtggacct	gtgcttcgaa	gcggctgtta	4560
catctccac	gacgcgggca	agtacgaaaa	gctctcgccg	ctcgtggcc	gacgggcccga	4620
gcaggaaccg	ctcgggtccc	acaacgcact	cactgcatgg	gcttcggtgc	tgtcccggcc	4680
ggagcctgat	ctcgcgatcc	tgtcgatcgg	gaagcgcgac	gcggcccatg	acctgacgct	4740
gccacagcca	cgcgagctgt	ttcgcgcgga	tggctcgagg	cagcggtgc	gggaagcgga	4800
gacgttcaag	ctgatggacc	agcacgcctt	cgttcgcgtt	gccccgggc	tcgcgatcgc	4860
tcgcggagac	atcgtcgctt	tcgacatgtc	ccaccgctgc	acggccttcg	acaagctccc	4920
cttcatcccg	atcatcgacg	acgacttcaa	cgtcgtcgac	ggcgctctca	cgttcttctg	4980
acggggctca	ggacctccta	cgggaggtct	cgggtgaacc	gacccacaaa	gctcccgaag	5040
tcagttggac	atgaccacca	gccacagaga	ggccccgaca	ccgtgtcccg	tcaggcgctt	5100
acagacgtcg	accttcctcc	cgcgggaggc	ccttactccg	ccgccgtacg	catcggcaac	5160
atcgtggcaa	tcgcggggca	gtgcggctac	ctcgcgcgaca	gatccctcgc	accgggtggg	5220
ctggaacctc	aggtgcgcgg	ggcattcgag	aacctcatga	ccgcgctgcg	ttcagccggc	5280
tgcagcgagg	cagacgtgat	caccgtgaat	gtgttcctcg	ctgacgggga	cgacttcgac	5340
gcgatgaacg	cgatctaccg	cgagtacttc	agcgagcccg	gccccggccg	gacgaccatc	5400
accgcgggtc	tccgaccggg	tgtcctgttc	gaggtcagcg	ctcaggccgt	ggtaggcggc	5460
tgaccggggc	actgccactc	ctcccaccaa	tgtccctcca	tcaacggcgt	gccacgactt	5520

tccggggccgc	cgtcaccgga	aaccgcaagg	acatgtcatg	gatctcgcaa	tcaatggaag	5580
agtcgccctc	gtactcggag	cggggggcgg	actcgggttcg	gccattgccg	cctcgctaag	5640
ccgggaaggc	gcgcgtgtgg	cgctggccga	catcgacaag	gacgcgtca	cggaggtcga	5700
ggcgtccatg	accggcgata	acatgagcct	ggtctgggac	ttggcgaacc	tgctcggtcat	5760
cgatgagaac	gtcaccgccc	tcgagagcga	gctcggcccc	gtggagatcc	tggtcaacat	5820
caccggcggc	ccgccgcccc	cccgtgtgtc	cgggcaggac	gccaccctgt	ggcgtcggca	5880
cttcgaggcg	atgatcctct	ccgtcgtcgc	gatcacagac	cgctgtctcc	cgggcatgac	5940
cgagcgggga	tggggccgga	tcacacgctc	gacttcgtcc	ggcgtcatcg	cgcccatccc	6000
caacctcggg	ttgtcgaacg	ccctccgctc	gagtcgtgtg	ggctgggtcca	agacactgtc	6060
cggtgagggtg	gcaagcgacg	gcatcaccag	caacatcgctc	gttcgggggc	gcatcgccac	6120
tgcgcgcatc	gcccagttgg	accaggcaaa	ggccgcacgg	gagaaccgca	ctgcggagaa	6180
catcgcgagg	gaatcagaga	gctctattcc	ggtcggccgc	tacggggcggc	gcgaggaatt	6240
cggcgacgcg	gtcacatttc	tcgccagcga	gcgtgccagc	tacatcacccg	gatccgttgt	6300
ccgtgtcgat	ggcggactgc	tccagaacgt	gtaaccccga	caaacatcct	gtctccagat	6360
cagcgcaacc	cgaagccatg	tcgctcctc	ggggtcactg	acgtcagcga	tcccagagccc	6420
aaactcatca	cctacgtgcg	ctgatctacg	gtcatccagg	gctaccact	cggcagcggg	6480
atcacgatca	gcagcacgga	cctcgctcc	aggggtgcacg	ctgcgcgcga	gcgggtgccgt	6540
cggttttcgg	gtcgccggcg	accagcttt	tccccacatt	gaaagctatc	cgggaaccgga	6600
tgctgcctgg	aaggcgact	tcaggtatgg	atgcccgaa	gcgaccttca	gctacctacg	6660
atcgtatctc	tggaaagagg	tcgtccgggtg	gcaggagcgc	aaacaccggc	gtactccctg	6720
gaaacagcta	cggcgacgct	acggcatcca	gccagccgac	ggcgatgtcg	ggctgttcga	6780
tccggaaggc	cggctcggga	gacgtgcagc	cgggtgggga	aggagcgtcg	acaaaatcct	6840
gacgacctgg	cactaccagg	acagctcgtg	ggcaagcgag	atcaggcggg	gtatgcgaaa	6900
cctccgatct	tgctaacagt	caagcggcga	cccgtttcat	ggctcgtgtaa	tcctcgcggc	6960
caccgcgcgt	ggcctcacgt	ctgtgcgcca	gcggaaatgt	cgcacaggcg	cggatttccc	7020
gaaaggaacc	catcgaatca	tgacgaaccg	tccctccgc	tggtcgctcg	tggggccgac	7080
cgacatcgcc	cgcgcatttg	taggccagc	gatctccgcc	cagcctgacg	ccgcggtgggt	7140
cagcgtcgtc	agcggcgacc	tggcccagac	gcaggatgta	gcggcaccat	tcggcgcccc	7200
gggccatgac	gaactcaccg	tggcgcttag	cgatcctgac	gtcgacgcgc	tgtacatctc	7260
gagtatcaac	tcggcacatc	acgatcaagc	acttgccggc	atcgacgcgc	gcaagcacgt	7320
cctgtgcgaa	aaaccgcttg	ccctgaccgt	cggcgaggca	caagaacttg	tcgatgccgc	7380
ggagaaggca	ggcgtagtgt	tcgcgacaaa	ccaccacatg	cgcaactccg	tgccacatcg	7440
tttgatccgg	gatgcaatcg	ccgccggcga	catcggcgag	ccggtcgcag	tgaacgtccg	7500
gaacgcgatc	cgactgccgc	ccgccgcgcg	gagatggcgg	acgaccgatt	cggcagcggg	7560
cggcggagtc	gcactcgacc	tcacgggtgca	cgacgcggac	tgtctccggt	tcgtactcaa	7620
tgccgatccg	ctaaccggtcg	tggcccatac	ctcgtccggc	cacatgacga	gggtgggaat	7680
cgatgagaca	atctccggaa	gcgcggagtt	cgtcagcgggt	gtgcatgctt	cattcgtgga	7740
aagcttcgtg	accggacatg	ccccacatg	cctggagggtt	ttcggaaccg	aaggagcgct	7800
catcggcacg	ggtatccagt	cgatgtcacc	ggtcggcacg	ctgacacacg	tcggtcgggc	7860
cgggtccagg	aagatcgatc	tgggtaccgc	cgaggacctc	tacgtcgtgg	gtgttcgacg	7920
gttcacgcag	gctgtgcgtg	gcgaggccga	gccccgggcc	tccggccaag	acggggtctg	7980
gtcgttggcc	ttcgcacggg	cggcgttgga	ggctgctcgg	accgggcac	ggcagactgt	8040
gggacaggct	cgatgacgaa	agctgggcgc	agttaggcac	aacagatcat	gcacaaggac	8100
aaccgggcat	cggcagacgt	ggcgatcgctc	gggtccgggtg	gaggctgact	gatcgtcgcc	8160
ggggcgctcg	ctggtcgcgg	actcgatgtg	ctcgtgttgg	aacgggacga	gtttttggct	8220
caagagcccc	ctatcgacgt	gtgcaaggct	tcgcgcacgg	gcactacaag	ccggacgaac	8280
ggtggctcga	tgggtgctggg	agaccgttca	caccggctac	tcactactcg	tcggcgggcaa	8340
cagccaaggc	ctacgaagct	ggcccgtggc	tcaatctata	ccgcgtgaagc	tcgccaacgg	8400
gtcctatgtg	ggcggccgca	actacatgca	gcacccgaac	tccgcgggtca	tggccatcgg	8460
caatggccag	cctccgatca	tggaccatac	ctacttcaac	atgcgccgtt	gcggggggccg	8520
cggacgatta	gctgaagcgg	atgtccgctt	tcggtatcgc	agaccttgcc	acgacggggc	8580
gtgttgccgg	gccgcgaacg	gatcatgtga	gccgggctgg	cccgagaagg	gcatgggcca	8640
acagagcagg	tgactacgtt	atctctgccc	ggtcatccaa	ctgatgacct	gtgcgcgcga	8700
ggtaaagccc	agcttgga	ggatgttctc	gacgtggggc	tcggctgtgc	gctgggaaat	8760
gaccagggtca	gccgcaatct	ctttgtttgt	tttgccagcg	gtgaccaggg	cagcgacctc	8820
gcgttctcgt	tttgtgagaa	ccggttcggt	ttccggagcc	gaagcggcgg	ccgcttcgac	8880
cggcgggtggc	ttctcccaa	gagcatagaa	gatagtctgc	tcccggttca	tccgcgtccc	8940

ctggcctcgg	gcggtttcgt	attcgggtgc	tgtgagtgc	tcctgggccc	gtgccttggc	9000
ctgtccacgc	caggtcagta	gcgtctcgga	tccgaacagc	ggggtgcca	tcagttccca	9060
cattttatcc	aacgccccga	aaaggatcgc	cgcgcgttca	ggattgcgtt	ctgcggcgcc	9120
gacccaggcc	agcagttcaa	cgcagtcgct	gatcccagat	aggtcgttga	gttcccgcct	9180
attgcgagg	gacctggacg	cggaggcgcc	tgccttggtt	gggtcgcccc	cggccccacca	9240
agtgatcgcc	atgttccact	ccgcccacga	tagcctccag	cgctcgccaa	gttctgtaca	9300
gatcttgccg	cattcgtgca	gaaggaccat	cgcccggtca	aggctctcaa	gcaggccccgc	9360
tgcctgcgct	cgtattgaga	aaatggctaa	ggcggggccc	gtccagtggc	cagttgcgcg	9420
gtggcgggcc	agtgcctcgt	cgagcagttg	cgtggcgoga	gtcaggttgt	tgtccacat	9480
ctcccggtcg	ccaagaaact	gagtcgcgta	ggtaaattcc	gtttcgtcgc	ccagtttccg	9540
ggccagctcg	cggctttcgt	taagcaggac	cagcgcccca	tctcgggtccc	cttgccggtg	9600
ggcaatccat	cgggtgatcc	acagtgcgcg	ggcacgctgg	ctgggtgggtt	cgggtctccag	9660
ggccaacgcc	ctgtccagcc	acatgcggcc	ctccctcaga	tagtcgccag	cagcccagta	9720
gaaccacagc	gcgctcacca	tccgcaaccc	aaccgacgcc	tcgccagggtg	tgggtgaagca	9780
gtagtccaac	gctgcccaga	agttgcccgc	ctcggcgcgc	agacgcgcga	gccaaccggc	9840
ttgatcgagg	cccgcgga	cggcatcgga	ctgctcggcg	agatgcaggt	agtagtcgcg	9900
gtgccggcag	cgcagagcgt	tttcggcacc	cgcctcggtg	agccggtcgt	gcccgtattg	9960
acggatagtc	tccagcatcc	ggtatctcgt	cttcgtgcgc	tcctcgggtcc	gggtgagcac	10020
ggacttgctg	atcagtcctc	cgagagcgcc	gaagacgtca	tcacggttca	gcccgtcgcc	10080
ggtgcagacg	ttttcggctg	cgtcgagatc	gaattcgtcg	gtgaaaaccg	aacagcgccg	10140
ccacaactgc	ttctcatgct	cattgcacag	gttgtagctc	cagtcgacgg	cggcgcgccg	10200
ggtctgatgc	cgaggatcgt	cggcgcggtc	gcccgtggtg	agcagccgga	atcggttctc	10260
cattcgcggt	agaatttgcc	cgactgagag	cacgcgaacg	cgcacggcgg	cgagttcgat	10320
cgctagggga	atgccgtcca	gcctccggca	taacctggcc	acgatctggt	cgttttcttc	10380
ggtgatgggtg	aaccttggtg	gcgcgcgcgc	ggcacgctgc	tcgaacaagg	tcaacgcttc	10440
acgttggtag	ggacgacctt	cctggttcta	cgttgatgaa	tcgctgccag	caggcacgga	10500
cagtggcgga	accggccagg	tctgttccgc	cactatccct	aaatgttctc	ggctgggtgc	10560
aagtatccgc	aaccgcgggg	ccgcggccag	cagcacagcg	actaggcgcc	tgcaggcccc	10620
cagcaggtgc	tcgcagttgt	ccaacaccag	caagacttgc	ttgtccgcca	agtaatcgac	10680
gagcacggcc	tccggggcac	gtgtcgaacg	gtcatggatc	ccaagagcag	ccgcgacgcg	10740
ctgcggcacc	agcatgggat	cgcgaacgtt	agccagctcc	accagaaatg	tcccggcgga	10800
gaaggcccg	cgcacgtcgt	gtgcgacgtg	cagcgccagc	cgggacttcc	cgatcccgc	10860
gaaaccagtc	agggtcacta	accgtgaact	ggacagcgcg	cgcttaactc	ttgtggccgc	10920
ctgacggcgc	cccacaaagc	tcgtcacctc	atatgggagg	cgaccagcct	cccgaaccgc	10980
aacccagac	acgactcacc	gcacctcggt	agaactagcg	ttttattgta	gcccgggtcat	11040
ggctggcagc	gcacttacag	cttgaacaac	tgttcgaacc	acttcgaacc	caccgacggg	11100
gttcggttac	atctcggccg	atgttgatcg	tgggtgggtg	ggggaggggc	tgcgttgccc	11160
gctggcctgc	ccagcctgta	ccactgatca	aggtcgccga	ccgggcccgt	gtgggcatg	11220
ttggcactgg	tcaggccact	gctggcggtt	atgcggcggg	ccagctgcgg	cggcacgggtg	11280
ggcgccatcc	gctccgctac	tgggtgcgcga	aggccgtcgc	gtccgcctga	cggcgaaagg	11340
tgagctcgtc	gtggaggcag	cggaccgggt	gatcgctgag	ctggagacgc	tgcgcactca	11400
gatcaatcgc	tcacgtggcg	agatctcgca	acgtctgcgt	gtggcctcca	tgcagaccgt	11460
caccttcac	ctgttccccg	agggtgctgac	tcgtctacgc	cggcggcgtc	caggactgga	11520
tgtggtgatt	gttcaagccg	agccggatgc	ggctcttcag	ggtctccagg	tcgacgacta	11580
cgacctagtg	atcgccgagt	cctaccgcga	gtggccggtc	atctatccgg	acgggctcac	11640
gacagagatc	ctgatgaccg	accgcagca	cgtcgccgca	gtcccatctg	tgggtccacc	11700
gcccgtcgcc	tgggggcagg	cgttttcgcc	gctggcgagt	cgttcaccgc	tctcgccgct	11760
ccaacgtctt	gcctgctcga	agttgtcccg	agtcgggccc	gacgatggct	gtgggtgaagg	11820
gatcttgacg	ctcatgcatg	gaggttcacc	attgttgagg	caagaggctg	atgacgggtg	11880
cggcggtcgt	tgcgccagcg	gcgatcatcc	agccgtgtgg	gagtagcggg	ctggctccga	11940
agaattggct	caggccggga	gtttggacga	cagcggccag	tgccacgaac	gagacaagcg	12000
cacacgccat	gaccagtggg	gtccgtccgc	gcacgaccag	ggtctgtccg	agctgggcgg	12060
cgaccagcgc	cacgagcgcg	accgtgttgg	cctggcgcg	ggttccgggtc	gccctgccc	12120
ggatccacgc	acaaatggcg	gccccggcg	tgaccgcggc	gcggcggtag	atgtcgcggg	12180
tcagcgcagc	gcccagcgag	gcttcggggc	cttctgccag	cagcatctcc	gcagtgatcg	12240
tcgggggtgg	tcgcaccgcg	atcgccatcg	ccgggaggat	gtcggtgagc	aggttgacca	12300
gcagcaactg	gcgggctgtg	aggctgcccc	cgcggttgat	cacaccggtg	acgacgggtg	12360

agccgatctc	gccgaggttg	ccgccgagca	ggatggccag	cgagtcacgc	accgatgccc	12420
acatggcgcg	gccttccaca	atggcgctcg	cgatgggtctc	gatgcggtca	tcggtgacca	12480
cgaggtcggc	ggcctcgcg	gcggcggggg	ttgcgcgctc	gcccagcgcg	atgccgatgt	12540
cggccaaacc	gatcgccggg	gcgtcggttg	cgcgcgtccc	ggtcaccgcg	accacacggg	12600
cgttgcggtg	cagggcgctc	acgatgcgcg	ccttctgcgc	cgggctgacc	ctcgcgaca	12660
ccgcgacggt	ggtcacttcc	gccgccagtt	ggtcgccgctc	gaggggtgtcc	agttcggtgc	12720
cggatcatgac	gcgacgctcg	ttgagcgcg	cgagttcggc	ggcgatcgcc	tcggcggtgc	12780
tgggggtggc	gccgggtgacc	atcacgacct	cgacacctgc	ctgctggagc	tgcgcgacgg	12840
cggcggccgc	agtgggccc	accgggtcgg	ccagcgcgac	gaaaccgatc	agccgcagat	12900
cccgatccg	ggactcgctc	agatcactgc	ggtccgaggc	ggcccgcctc	gcgacagcca	12960
gcaccgggta	gccctgccc	gcgaggtttt	cgacaactcg	ctcgacgcct	cgacgagcgg	13020
tctcctccaa	cggcacgtcg	ccatctgata	tgcgccaccg	ggtgcactgg	gccagcacga	13080
tctccggggc	acctttcaca	ctcagcagat	tgcgcgtcgc	ccaggtgccg	agcaccgcgt	13140
ggtagccacg	ggaaggctcg	aaggcatct	cgtcgatcgg	taccagcgcc	tgcttgctt	13200
cgccggggtg	cactcccgcg	ccacgcgcgc	catcgacgac	cgcgcgatcg	gtgggatgcg	13260
ggagcagttc	tccgttctcc	accaacggac	ttgcccgcaa	ggcaccgcgc	agcactcgcc	13320
gttccactgt	ggagatttcc	tcgagccacc	ggctcgacgc	gccatcggt	acctgccgca	13380
gcgcgatgcg	cccttcggtg	aggggtgccg	tcttgctgaa	acacaacacc	tgcgcccgc	13440
ccaaagcctc	gatcgctcgc	gagttacgca	ccagcgcccc	gcgtttcgac	agccgcgggg	13500
cgccgcgcg	ttcggcgacg	gtggcaacga	acggcaatcc	ctcggaacg	gccgccaccg	13560
ccaggtcac	cgcccgcccc	agcgatgtcc	ccaatggacg	cctacgcagc	atgtccgtga	13620
cgagcagaat	cccaccgct	cccacgcaga	tcggcacctg	caccttgccc	agcgtctgca	13680
ggcgagccgc	gacaccatcg	gcacctcgcc	gggcacggg	cccgatcgcg	ctgcctgcct	13740
cgggtgttcgc	gccggtcgcg	accacgacac	ccaccgcccc	ccggcagcg	accgcggtcc	13800
cccggtagat	catgcacgtc	cggtcgcga	ccggcacccg	cggagtcgcc	gtcacctct	13860
tggtgaccaa	catcgactcc	ccggtcaggc	tcgactcacc	gacctccagc	ccgtcggcct	13920
ccagaagccg	gtagctggcc	ggaacagcat	ccccggccac	caactccacc	acatgccgca	13980
gcacgagctc	tcagcgggc	aactgcgtca	cattttcctt	acggcgccac	acaaccgaa	14040
caacgctggc	ctccagaagc	ctgttcaaag	cgcggctccg	ggtgatgcgc	tgcacgcgcg	14100
cgatcaacgc	gttcatcccc	agcacgcccc	tgatgatcgt	cgcgtccgca	acggcacgca	14160
tactcgccga	gatcgcgggc	ccaccgcca	acgcggcggt	caacgggctc	gccagctcct	14220
ccagcgacgc	ccgcaacaca	cccatccggc	gaaggcccggt	ccctcgtcc	tgaccttggg	14280
aacgctcgtg	cgcgcacatc	tcggtcagac	cctgcgatga	actgccgagc	agctccagca	14340
ccatgccggg	gcccatcgca	tgccaggcag	tgcgcggcac	cgcgcgcgga	accggacgcc	14400
acgcggcctg	catccccac	cacgtcccag	cgcgcgagcg	gattgccgca	cacacggcca	14460
ccggaacgcc	cgcacggacc	tggctcccga	tggcaggccc	gaacgcgccg	aacaccgccc	14520
cgtgaccga	accgatcaac	gacagctgcg	cgtacgcac	gctgacataa	cgcgcggctg	14580
ggaccgtact	caacaacgca	cacgactccc	ccaggtcgc	gcccagatc	aggtgcgcac	14640
cccacggaac	ctcaccacca	cgcgtcacac	caagcccgac	atccgcagcc	gccagtgcg	14700
ccgcgcggcg	cgcggacacc	acaccgacca	cgtgccttc	ccgctgcac	tccgcacca	14760
ccgaagccag	ccgcaccca	ccgggacca	cgcgatcaac	accgatccgc	ccgcacca	14820
ggccccatc	accgcgaga	accaccgacc	cgacctcgcg	agctgccgcg	accaactcct	14880
cagcgagcgg	atccagctcc	tcggcagcca	gaacccacgc	ggcgtgcgc	gaatcgtggc	14940
gcagcgcgaa	cacctgata	ccccgaccg	ccacctcgcg	cacgtctggg	ggcaaccgcg	15000
accgagcgac	cgagtacagc	gaccaacat	cacgtgcgc	gccgacccc	ttggtcacac	15060
ccacgagttc	atgcgcacgt	tcccacaact	cgacgaccgc	gcgccccccg	tccgcgggaa	15120
tcacgtcatg	caccaaccga	gcaccggtgc	gcagaacgtc	cgcgtcgatc	accaccgtgt	15180
cgaccgggtc	caaccgccc	aacaccggg	catcgaacac	cagagtcgtc	cgtccgaca	15240
gcccgtaccc	gagctgcgcc	gcgaacgcgc	ccgcgccac	ctgcgcgcg	cgcggcgcg	15300
ccgcgaccac	catgcctgc	gcacgtgaa	aactccgct	caccccgagc	atgcccgca	15360
acgcgcggcg	cccacccaga	gccgaaccgt	tcggcgcgcg	ctcgaccggg	ccggcgggca	15420
acggcacagg	acgcggccga	acccccaccg	gcgcactacg	gtgactggca	ggatgcgccc	15480
ccgttcgggc	ttcccaccgc	gccagctcc	gccgcgcgc	ctgcgtctcc	cgcaacaggc	15540
agaaccggta	ccccgattcc	gccagcaaac	tcgcgggacg	ccgcgcaagc	gtgttcccca	15600
acgcactgct	aaaccggaac	aacaggctcag	tggcggtctt	cccgatccgc	gtttccagcg	15660
gcccccgga	ccaggaggcc	gactcaccgg	tcgacaccag	cgccggaaca	gacggcgga	15720
gcacgggcag	cggcagcatc	cgggccccca	ccgcgatcac	agcgccgggtc	aagttcgcac	15780

ccagcacggt	cgcctcagcg	atcaccttga	ccggattgtc	cgggtggctc	acaccgaccg	15840
cagcgaacgg	ttcctcgtcc	aaaccgggtg	ccgcctccgc	gtcctccacc	acaccaccca	15900
gctcagcgac	cccaaccagg	cccgatcggt	gcccgatgac	caccgcgcgc	acgacagcgt	15960
tgatctcgac	ccacgcaaca	ccgggcacct	tctccaaccg	ccgggcgatc	tgctcgccag	16020
cctcctcagc	ccccggctgg	tcaacaccgc	gcacctcgac	gtacgcacgc	ccctccgacg	16080
accacgcccc	ccgcccgcgc	cccaagcccc	cgatgctctg	cgcgacagcc	accaccggcg	16140
ccacgatctg	cgaggccaac	gcgcccgaag	tacgcagcat	cgaacacact	cagctgtccg	16200
acgcaaagcc	gaccgacgcc	cgtgacaccc	ccgcgcgggt	cgcgcccgca	accggccatt	16260
cgagccccc	accgaccggt	accgcgcgaa	ccgcgtctc	ccaacgaccc	ggcatgcgaa	16320
catcgacccg	acgaaactgt	gccacgacgg	gcaggctgac	cgccgcgggt	cgcaaccgcg	16380
ccccctgttg	ccgcgcgcct	gcgccaggcg	ttgtgttccg	cgccgtccta	gccaccacta	16440
cctccgcgc	gcacagatac	cgtgagtcac	gagcgtagga	ccgacgagcg	gaaagcgaa	16500
ctcgaaacag	ccgcacatcc	gtcctctcgg	tggcctgcga	gctgatcagc	aacaccgacg	16560
gcttcgccac	gctgttcgac	ccgccgacac	accagtagtc	ccagcggtgg	tgaattcaag	16620
gccgcctgtg	tgctcgggtt	cttcgaaacg	gctccgagca	tgacgtacg	ccggacgcag	16680
gcaacgcaac	acctaccacg	gttcacctgg	cctgagcgcc	gccgcggcgc	gctcagcgac	16740
gcctagcccc	gaaccgcgta	caaaccggat	cacttcgacg	ccggtccgcc	ggcacgctgc	16800
gcgaccgcga	caccacgcgc	aatcgccgcc	gccaccggcc	agtcctatcaa	ccccaacagg	16860
gtcagcgctc	caagaccacg	atagaaggcc	atcgtctgat	ggtccgggag	aacgccccga	16920
acggcctcag	ccgcgctagc	aagatcatca	cgagtgggaa	tgtagtgatc	gggacgggtg	16980
aactcggcgc	ttacgcccgc	cagactcacc	gtcgttcccc	cagcaccgcg	cggtttccgc	17040
tgcgtagtaa	ccacggcacc	tctcaacac	aggccccatg	ccgcataatc	ggcctcgcac	17100
ggactcaaaa	ccgccccaa	cgaccaaccg	ggcaacacga	ttttatctct	gaacacgaac	17160
gtccccgcgc	cgagacgggt	ggaatacggg	ctgccgcggg	acctgaacca	gtcaggcggt	17220
gtgcttcaac	aacgttgctg	tgaccccacc	tgctcgggtt	ggccaaccgt	gtggacgcaa	17280
cgccggctcc	agtgtgctc	ggtgatcaca	ctcgttgatc	atgatcgtct	ggactgcggg	17340
ttgatcaagg	caatgttccc	gcacctggcc	ggggtgcggg	agcggctggt	gcgcgggttc	17400
gcggagttca	ccaacgagta	tccgtggcgg	tggacaccgt	cgcagtgtga	cgaatggctg	17460
caatcaccca	ccggagaacg	gcactctcgc	ccatccacaa	tccgcgccta	ccaaggcagt	17520
ctcaggctgt	tcaacgaatt	cctctgtgac	agccggtagt	gctgggcgct	ggcgtgcgag	17580
gcgtcgttcg	ggccggacga	gtaccgcggt	gcgaatgtgc	acgagtggaa	ctcactcgcc	17640
catctccagt	cctatgaggg	cgatccggac	gaccgcgcgt	tcaccgcgca	tgagctgcag	17700
cggttccttg	actacgccac	gaccaagtgc	accgcgcggg	tcgcgcgaaa	cgcaaccggc	17760
cattggcagc	ctatcgagac	gcgaccttgt	tcaaagtgat	gtatcgctag	ggcttggttc	17820
ccggggccct	accgcgcgtg	gctcccgcga	ttttttgagt	ttgtgcagtt	cagaggacga	17880
tgtgggagat	gctagccgtc	gcgacagatg	tgggtccagt	aggcgcggca	ggcaaacctc	17940
agcggctcgc	gtgcagtatg	cggtcgcgc	gcagtgcgcg	gggtgggttc	ccctcgaaac	18000
ctgcggatcc	gtggaggtag	ccggcgatga	ggtccggggc	ggagtgggtc	tcgatgcccg	18060
tgaaccgag	ggcgtgaagc	tgtgcggcga	tgctcgtcgg	tgtgaagtag	ctgaacaagg	18120
gttcgcgggc	gccggccagc	cgatcggcac	gtgccgcgtg	gtgcgcacgg	tctcgtcgcg	18180
tggccgcagg	ctgcaggtag	tcaagacca	cctcgaccgg	ctgggcttga	ccagcgatgt	18240
attcgagggt	ggcgtggggt	gcgttcgcgg	tcagatagaa	gacaacgccg	agccacacga	18300
atactgccgg	gtccgtccgt	ttgaatccgg	cggattccaa	tccagttgcc	agcggctggg	18360
tttcgaaatc	gaccggtagc	aagggtcaacg	tctcaggggc	gtcgatccct	gcgctagcaa	18420
ggcggttcgc	tttccatgct	tgggtggcgg	ggtggtcgac	ctcgaagacg	cgcaagtccg	18480
ggcgcggtat	gcgataggcg	aagggtgtcca	ggccgcgcgc	gaggatcacg	acctgccgta	18540
caccatcggc	gatggccgcg	gccacggcgt	cctcggcgaa	gcgggacacg	gcggcgaa	18600
acaggcgggc	gggctgatcg	attgccccgg	cgccgaggtg	atcggttgtg	ggcgtggcca	18660
atttggtcag	ttcctctcgc	gtgacgcgga	gcagacgtac	cgccaggggg	tcggtgaaga	18720
tctgtggtcg	gtcagcgatc	tggtgatagg	cgccggcgta	cgcggtagcg	agcgtgtctc	18780
ggctgggtcc	gccgtttctc	atgttcaaga	acttactcac	gaacgcggcg	cggtctctat	18840
gaactcactc	acgcccgtct	cacaaaggag	cacgcgaaca	cgatccgtaa	ccacagctgg	18900
ccctccttta	gggagattgc	cacgagtcga	caggcagggc	tcgaacctcg	ttatcggggc	18960
tgggttgatg	tggttagacc	ggtcatgagt	tcgcggttgg	tggccccggc	gcggcaagat	19020
cgcggcgcg	ttcgtcgagt	tgctgttgc	gcggcaagaa	acgacagctc	ggccgaccgt	19080
tcaacggtca	cgggtgcgttc	ggaccgcgtc	ctgccaccac	acctgacggt	ctttgtcgtc	19140
accgggccc	ccccattgat	gtggccgcgt	atgctcgaat	gcgcacgagt	ggtcagtc	19200

cgccggttcc	cgcagcccg	cttcccccg	gaagacggcg	cgttcccga	cggcagcccc	19260
acgcgttcac	ggggacgatc	atcgggtccac	gaggcgaata	cctgctccgt	gcaggtggaa	19320
gcggctatcc	caggggcccc	gccgtgggtg	ctcgaatcgg	cgctcgcacg	cggtcgacgg	19380
tgggcgcggc	atgatgagcg	accgtgctgc	tgcgactggc	cttgccatag	ccgataacct	19440
cgtccgtgca	ggtcacacag	cagcgtctga	cggttttccg	gtcgagcccc	gccagccggg	19500
tcacctcacg	cagcgaatgg	cgcgccagcc	acagctggct	tggtttctcag	cggttgaaca	19560
ccggtagctc	ggctggaggt	tgcgggatga	atccgcctg	ctgggccatt	tggtcgtaga	19620
gatgaccgtg	cgactccgcg	agcgttgcaa	gcgctccgtt	gacgtcgacg	tgcaccagcc	19680
ggcgtttccg	cttgaccacc	cgcccatcga	ccagcacctg	gtgcacgttg	cccagattgg	19740
tctgcgcaat	gatcgcgcca	caagggtcgt	ggcggttcca	accggcctgg	ctgatgcctg	19800
acatgtccag	caatacgatg	tgcggccgct	tgcgcgggtg	cagggttcc	gtcacgtcgt	19860
cgcgcgccgc	ggcgcgggca	ccgttgaccg	tgagccaccg	taaggcgtcg	cgcgttttcc	19920
accgcacgat	cgtgggcagt	gtcgaccgcg	cgtagtcttc	ttgatcgtcc	ctccatcggg	19980
tcacctgtag	gacgagccgt	gcgtgcgaaa	tcatgtcgcc	gcaggtaactg	ctcgtgcagt	20040
cgatgccgag	gcttggtccc	ggcgtgttct	cgggtggcctc	acgaatgacc	gggaatccca	20100
tgcccatctg	catctcggtc	tgcgcgcaaa	ccgagatcat	ggtgccggta	ccccgcagca	20160
ggtgccattc	gttctcagtg	ctgaatgtcc	cgtgcaccaa	gagaaggctcg	ctgccgagca	20220
tggtgtggga	gtgcagcgcc	togatgtcct	tgaacagggt	gcgcgcgatg	acttggttgc	20280
agtggaacgt	gatgcgtgcg	ccgagctcgc	gggccagctc	gaattcctgc	ttgacgtccc	20340
cgaagggagc	gatggctagt	tcttgccggg	cgatgccgaa	gcgcagcaat	tggtgctcgc	20400
tccggaagta	ctgggcgcgg	atttcccggg	ccagccgcgc	ccgcggggcg	aagtcgcctt	20460
cttccaccga	ctcgtccagc	ccgcctttgg	tctcggacca	cgtgttcgac	gtgatgggca	20520
ggaggccgtg	gccgtacagc	gcgcgcacgc	ccgcgtcgcg	gagtcacagc	accgcggcgt	20580
gcgcgtgctc	gccggtgacg	atgttgtggc	agtaatcgac	cagcgtggtc	acccccgagt	20640
taaggcaatc	gaggccaccg	aggtagttgc	ccgcatacat	gtcctgcggg	cggtaacttcg	20700
tgcocattcc	cagccggaat	ccccccaggt	agtcgaggat	gttcccgtcc	gccagaatgc	20760
cccgagcccc	ggtttgcag	gtgtgtcgat	gggtgtcgac	catgccgggc	atggcgatca	20820
tgcagcaggc	gtcgattcgc	tccgtgtcgc	caacgttgag	gttcggcccg	atctcgacga	20880
tgacaccgtt	gtcgacgagg	atgtcggctc	gttcgaagtc	gccgagaacg	tctgccatcg	20940
tcaccacggc	agcgttctcg	atcagtgtgc	gcattggccaa	gtgtctctct	ccgcgcggtg	21000
ggcatcggat	gccgtcctca	agcgggtccc	ttcgggtcgtt	gatcgactgt	ggagaagagg	21060
ctgtggagag	gggcccgtctc	gcagacgggg	cagcttctac	tggtccacgc	caatccgaaa	21120
accggcgggt	gtcagtcgca	tctgcgcgcg	gtcttctgtt	gaatgaccca	ggtcgcgatt	21180
tgcgtccgag	tggtgaagcc	gagtttggtc	aggatgtgct	cgacgtgggc	ctcagcggtg	21240
cggcgggaga	tcaccatgat	ggcggcgatt	tctttgttgg	tggtgccctg	tgcgaccagc	21300
gctgtacact	ctcgtcgcg	cggagtaagc	accgacgcgt	gcgtttcttc	cgtcctggag	21360
cttgcgtggt	ccccggcttt	gcccggattc	cgtatccatg	cgatggcctc	gtcgaagtcg	21420
agctgtgtgg	cgtggtgaac	gcctttctga	aacgtctcgt	cgccgagtga	gctacgtgct	21480
actgcctcgt	agtggctcgt	taggcgcgca	acatgtttgt	ggccggcgag	cgacgcacgc	21540
acgttctttt	tgatcgtttg	ggacacgccg	aacaaggctg	cagcccgtgc	cgggtcaccg	21600
tctgcgtcgg	ctatgcaggc	cagaatctca	acgcacaacg	cgatctgaaa	ctgctcatgg	21660
aagccgagcc	gcaggcgaag	actctccagt	tccgcagcat	tggttgcccg	gtaattgccc	21720
gctagttagt	ctgctattcc	cttcgcccac	agggcaagcg	atctcatcca	ctgttcgctg	21780
taggtctcct	tgacggcagg	gcaccgcgg	aacagggcag	cggcgcgctc	atgatcacca	21840
aggaacgcga	ctgccaacgc	gagctcgatc	tgatcgtagg	cggcggcagc	gtgatcgcca	21900
atcagccgat	gcttggcgag	agcgtcttcg	aagagcgcgc	tgcgccgcgc	cggatcttcg	21960
ttgaacaggg	cggtagaccc	cgagatctgc	gcgacgtagg	ccgcccctga	ttggtcgccc	22020
aactccgccg	ccagcgcgct	cgctgctcgc	agaagggtcg	acccggatga	cgcgtcgttg	22080
agcgcggcat	tcaggtaccc	gtcgacgtag	agagctttga	cacgtaccgg	atccgcacgc	22140
aatcgatggt	aaccggacat	atgcggctaa	tggtgcacaa	cgggcagtg	tgatctgacc	22200
acgctaaccg	gtatctcggg	cgggtcgcgt	gctgcgcctg	tcaagctcaa	gcgtgcggtg	22260
cgtcttccgc	tgcacgatct	acaagtacgt	ccccgaactc	agcaccacc	gagcgtcgc	22320
ctctgggccc	ggtccgcagc	cagcgttcca	gagctaagcg	ctggtttccg	gcgtctgcta	22380
ccgggacgct	tgcggccgcg	tggtttcagc	gcaagtgagg	gttcctcggc	gggaacccaa	22440
gggtccgtcc	cgcacaggac	caggactgga	cccgtgggtt	cggctcaacc	cggagtgtcg	22500
catttgatcg	tggtttccag	cagtaatgga	tgtgaatct	tgtgattgac	gccgcgcgca	22560
ccggagagtg	tcttgagaca	accgattccc	gcgcgattcc	ggaccatcca	tccgacctag	22620

gttctgttgc	gacctgagcc	cgccggcgcg	gcgaggtttc	cgctcaagt	ggccagggtcc	22680
agccattcct	cgatgggcag	cacgtgtgcg	cggtgtccgg	cgtgcgtgcg	gaactcattc	22740
tccgggtcgg	agacctcgac	gtagcccgcg	atcttgtccg	gctgttccgc	ctcgtagtgc	22800
atcggcaactg	cgtaccgggc	gtcgaggatc	tctgcggctg	cggcggcctg	cctcgggtcc	22860
atcgcggcgg	gcagcgggct	cggcggtcgg	aggtgtggcg	cgtcgaccac	cgcgcggttg	22920
gcgggcagga	acaccgcgtc	gaacgggctg	aaccggcgcg	cgatgagcca	ccagtagccg	22980
tggaacatcg	tgtcgccgcc	gtggaagacc	cgtgcccgt	cggcctgcac	caccagttc	23040
agctgcgggt	cgcccagccc	gtcgacggcg	gggaccggcg	tgacgcggaa	cggcccagag	23100
tcgcgggtgg	accaggcatc	cacgacctcg	gcagccagtc	ggtgcagtgt	cagctcgcgc	23160
tcggccggca	gtgtcgtcac	gttgccacg	tcgtcgccgt	ggcggggcgc	gggtcggagc	23220
accggtgccc	ccggtgtcag	cgcggccgcg	agcgcggccg	cgtcgggtgtg	gtcccgggtgc	23280
aggtgggtga	ccagtgcggc	ggtgaccgtc	ccgctcggca	ccgccagcct	ctcgcgggtg	23340
ttccacgcgg	tgaacagcgg	tgagagggtc	cgtacgtagt	cgatcaccag	tcgcttgccg	23400
cccgcctcga	tttccagttc	ggcccagccc	agtgcgtcga	cccgcattct	gcactccttc	23460
ggtccgtggg	tgaagcggaa	tttagcgtac	gcacgttcac	taaatacaata	gcgaacgcgc	23520
gtacgctatc	ctcgtcacat	gtcaccgcga	cgtcagcgg	ccgaagcaca	ggccaccagg	23580
agccggatcc	tcgaccgtgc	cgcgagatc	gcattccgag	aagggttgga	cggcatcacc	23640
atcggccggc	tcgcccagga	actggagatg	agcaagtccg	gggtgcacaa	gcacttcggc	23700
accaaggaga	cactgcagat	ctccacgctg	gacaaggcat	tcgtggactt	ctggcaccgg	23760
gtggtcgagc	ccgcactggc	cgagccgcgc	ggtctgcggc	ggctgcgcgc	ggtgtgcgcc	23820
aacgcctgg	gctacctaga	agcgcactg	ctgcccggcg	gctgcctgat	gaccgcggcg	23880
ctcaccgagt	acgacggccg	ccccggccgg	gtccgcgacg	cgggtggccga	ggtgtggtcg	23940
cgtgggcggg	gacagctgcg	ggcggacctg	accgcggcgg	tgagaaacgg	cgagctgcc	24000
gccgggttcg	acatcgacca	ggcgtgttcc	gagatcgtcg	ccaccgggct	ggcactgaac	24060
gcggccatgc	agctccagca	cgaccgggcg	gccgcgcggc	gggcccgcgc	cgcgatcgaa	24120
cgggccttgg	accagctctg	acgcccgcgc	cagacaaacc	cgcccgatcc	tttcccagg	24180
accagaccgt	ctgaccgcgt	tcctgctggt	cagcccgat	ccatcccatt	tttcggcgag	24240
tacgccttag	catggtcacg	agacattccc	ggagccgtca	ttgattgact	ggcgcagcga	24300
aaagctactc	gccggttgct	ttgcaccttg	ggtcagcttc	gggagttccg	ggcccagagt	24360
cccggtgggtt	cagtgtgagt	gaaggttcct	cgtgaggagc	ccgaggggga	ctgccaccag	24420
ggtctgaaga	cttcgtgaag	aaggatgaa	cccgggttgg	gcatgcttcg	ttatgagggt	24480
atgggaagcc	aaggcttggg	agcgtggaca	tcattggcaa	cgatcacggc	acggtgctcg	24540
ccaccatgat	cttcaacctg	gtagccccgg	cgggtgtgat	cgcgccagtc	ggcgtggagc	24600
tgcggtacga	cagccgcaat	ccgtacgaga	tctccatgaa	gctcaacgta	ggcacggacg	24660
gtcaggtgga	ctgggtgatc	gcccgcgacc	tgctggccga	cgggctgatc	gccgaggcag	24720
gcgaaggcga	tgtgcggatc	ggccctcgac	ggggttttcc	ggggttggtc	gtgatcgaga	24780
tgagctcgcc	gtcggggcag	gcctccttcg	aggtgaatgc	tgaccagctt	gcggaattct	24840
tgaacgacac	ctacgacgtg	gtcgaacctg	gtgatgaaca	ccggtggatg	aacgtcgacg	24900
aggtgctgag	ccagctgctc	tcgcacaacc	tgtaatggcc	cagctctccc	gaagcgcgcg	24960
acgccaaaagc	gctggctgcg	ggacctggcg	gcgctgaaca	ccgccacgct	gtgtctccga	25020
gctccagctg	gaccacgtcg	gtgccgtgcg	cccggctcgg	tcaggccgaa	ggtgctgatc	25080
ttctccaggc	gcgccatcgg	cgcaggaagc	gctgcttctg	ctcccgcgcg	agtaccgtcg	25140
tgtcatggcc	acggacagct	tcgattcctc	gaagctacag	gcggccgtgg	catcgagcgt	25200
cgcgtcgtgc	gtctcggaag	tcagccgaga	cgtctacacg	cacctgatta	ccgaggctcc	25260
gcagttcgca	gccgatgaga	tcgtcctcag	cattctacgg	acgagtgttg	aggaaaatat	25320
cgccacattg	ccgcacgttc	tcgaattcga	gattccggtg	ggatattcgc	cgggtcctgc	25380
tgcggtgttg	gagtatccgc	gacgactggc	gaaacatttc	catcaacgcg	ctgatcaggg	25440
ccaaccgcat	cgggcacttc	cgttctctgt	agtgatgcct	cgacgagatc	cgcgcaccaat	25500
gcgccgacga	ggcgtatcc	gcagcgacca	cgcaacgaat	gctcgcaacc	agcttcggct	25560
acatcgaccg	cgtcacggag	cagatcgccg	aaacctacca	gctcgaacgg	gaccgctggc	25620
tcctggcgac	gggacggccg	tgaggctctc	gcggcatccg	catagcgtct	tctcccgtcg	25680
aggcacatga	ggtgttgccg	gcggctcgtt	ccggcagtcg	cacggcattc	gtcctagctg	25740
cgggcaattg	agggagcgaa	gatttagagg	agtgtggcca	cgcggaccaa	gccggcgagt	25800
gctcgggagc	ggctgtgggg	cggccaggcg	atgactgtcg	tcacgtccgg	cgcgtctaga	25860
accggtacgg	cggcgaggcc	ttcgagcagg	ttgacgcgac	tggaattcggg	catgaccacg	25920
gtagtgcggc	cgagtgcgat	catttggaac	agttgcgtct	ggttgcgtag	ttccacgcgc	25980
gggccatctg	gatagacgcc	gtcggggccg	ggccagcgcg	caagcgggag	atccggcagt	26040

gagctgacat	ccgccatccg	tacatggggc	togctggcaa	goggatgcga	ggtcggaaga	26100
atggcgactt	gttgctcggg	gttcagaatt	togatgtcga	gttcggccgt	cgggtcgaag	26160
ggttgatgca	acagcgccac	gtcggcccgg	ccgtcatgca	gcgttttctg	gggctgggat	26220
tcgcagagca	gcaggtcgac	ggccacgggt	cccggctcgg	cggcgtagcg	gtcgagcaac	26280
ttcgccagca	gctcaccgga	ggcgccggcc	ttggcagcca	ggactagcga	gggctggctc	26340
gtcgcgccac	gctgggtgcg	tcgctcgggt	gctgccagcg	cggcgaggat	cgcccggcct	26400
tcggtcagca	gcattgcccc	ggcttcgggtg	agcgagactt	tgggctgggt	gcgttgcagc	26460
aacacgactc	cgagtcgttg	ctcgagctgg	gcgatcgtcc	gcgacagcgg	cggctggggc	26520
atgcccaggc	gctggggcgg	ccggccgaag	tgcaactcct	cggcgactgc	aacgaagtac	26580
cgcaactccc	gcgtctccat	ccgtcgagcc	taccgctgat	tcatatcagc	tgggtatcgg	26640
tgtgagacct	agatggtggt	ggttccccgc	cggtttcggg	ccacgctaga	aagcatgagc	26700
gaacagacga	ttgcactggg	caccggcgca	aacaagggaa	tcggatacga	gatcgcggcc	26760
gggctcggcg	cgctgggggtg	gagcgtcgga	atcggggcac	gggaccacca	gcgcggggag	26820
gatgccgtgg	cgaatttgcg	tgcggacggc	gtcgatgcgt	tcgcggtatc	cctggacgtg	26880
acagacgacg	cgagcgtcgc	ggctgctgcg	gctctgctcg	aggagcgcgc	cggccggctc	26940
gatgtgctgg	ttaataacgc	cggcatcgcc	ggggcatggc	cggaggagcc	ctcgaccgtc	27000
acaccggcga	gcctccgggc	gggtggtggag	accaacgtga	tcggcgtcgt	tcgggttacc	27060
aacgctatgc	tgccgttgct	acgcgcgtcc	gagcgcgccg	ggatcgtcaa	ccagtccagc	27120
cacgtcgctt	ccctgacctt	gcaaaccacg	ccgggcgtcg	acctcggcgg	gatcagcgga	27180
gcctactcac	cgtcgaagac	gttcctcaac	gcgatcacca	tccagtacgc	caaggaactc	27240
agcgatacca	acatcaaaat	caacaacgcc	tgccccgggt	acgtcgcgac	cgaccttaac	27300
ggcttccacg	gaaccagcac	gccggcagac	ggtgccagga	tcgccattcg	gctcgccacg	27360
ctgccagacg	acggcccagc	cggaggcatg	ttcgacgacg	ccgggaatgt	gccctggtga	27420
ggcgctcagt	cggcgatggg	gcaatcgaag	tcggagaggc	tcgctgcgac	cgggtacgcc	27480
gaacaacacc	tgttcctgtg	ggtacggatg	tcggccttcg	ccgtctcggg	cattgacaac	27540
ctgtacttcg	ggcgccggtta	ccgcgggtgc	gccgcgggtg	cctggcgaca	ctggggccagc	27600
cgtggctcac	cggcgcgctta	ggtcaggcgt	gggcgggttcg	cagcatggcg	ggtgcggctt	27660
tgcgtaggtc	gggtaggcgc	atccggcgcg	ggagcgggtc	gagttcttcg	ccgatggccg	27720
gtgctttggg	gctgctcagg	agccgaacac	ctcccagccg	cagggtgccgg	gctgaaccga	27780
gtggttctcg	tcggctcgga	tcacaacgtc	tgccggaaca	gctgcggcga	ggtggtcgca	27840
gattcgaggc	gggatcgtcc	tcggcgacct	tgccgacgat	cgcggctagg	gcccagggct	27900
tcgtcgacct	ggttggcacc	tagatcacga	cggtaaaaac	ttgccggcat	cagagacgat	27960
cgaagtgate	ccgggtcacg	tcggcttatc	ggtcgagtga	gtcccggggc	ctgccagacc	28020
aggtcttgcg	tcgttggtcc	gggctcagtt	gcggattccg	acgaacaggc	ctcgcccggt	28080
cggtgctcca	ggaaggtatt	ccgcgcggat	ccctgcgtct	tcgagcgcgg	cgggtgtactc	28140
gtcctcagtg	aacagcgaga	ggatttcgaa	ctctgtgaag	tcccggatcc	cgggtgggttc	28200
ggcgactgtg	tagcggacgg	tcataccgggt	cgtacggccc	tccaggaccg	agtgcgatag	28260
ccggctgate	accgcgtcgc	cgtggtgcgc	gacggctccg	gtgacgaacc	cgtcgatgaa	28320
cttgtcggga	aaccaccagg	gttcgatgac	cgcgactcca	ccaggggcca	ggtgccgggc	28380
catgttccgc	gtcacgcgtc	gcaggctcgtc	aacgggtccgc	atgtaagccg	cggtaaagca	28440
caggcagggtg	atgacgtcga	atggctcgcc	gaggtcgaaa	tcgcggatgt	caccgatgtg	28500
aatcgggtacc	tcagggactc	gtctgatcgc	gatctcccgc	atcgcatcgg	acagttcaag	28560
ccccgcgacc	ttcgcgatatt	cggcacggaa	tcgctctagg	tgcgccccgg	tcccacaggc	28620
gacgtcgagt	agggaactgtg	cttcgggcag	cctggtgcgt	acgagctgga	ctacttcccc	28680
ggcctcgggt	gcccagtcctc	ggccacgcgc	ggagtggatc	gcgtcgtaga	tgtcggcatg	28740
atctgggctg	tataccgagg	aggtttctgc	gaatgtgtcg	ctcacgcgcg	acatcctcac	28800
tttcggagtg	gtgatctttg	gctgatgtgg	tgttcgacgg	ccttctggaa	ctcgtcagcc	28860
accgtgcgca	cctcggcgctc	gtcaaggctt	gggtgcagtg	gtagcaggag	tgttctgcgg	28920
caggcgtgct	ccgcagaagg	cagcttgtag	tccgcgcggg	agatggggac	cttgtgcagg	28980
ggcgggtagc	ggtagctcgt	gtagatgccg	cgttccagca	tttgctgcgc	cacctgggtc	29040
cggatctccg	gagccagctg	gacccagtag	aagtagtgtg	acgagacgtg	cccatccggg	29100
agcgtcggcg	gtaggaggac	acccggcaca	tcggaaagca	accggtcgta	ctgcgtagcg	29160
atcttctctac	gcctgttgat	gaattctggc	agtttgcgca	gctgcacgct	gccaagcgct	29220
gccgtcatgt	cgttccccgat	cagccgctgg	ccgatgtctt	cgacgcgaat	atcccaccag	29280
cggttggaag	acttgggccga	atcgaatccg	ctcatctgct	caagaccgtg	gtaggcgagt	29340
cgtcttgccg	ggtgcgccag	ctccggatcc	gccgcgtaga	acatgcccc	atccccgggtg	29400
accaggatct	tcatcgcatc	gaaactccac	gtggccagggt	caccaaagggt	tccgcaagcg	29460

gtgccgtgca	cggacgatgc	caccgcgcag	gcgagatcct	cgatgagcat	gaggcccttt	29520
tcacggcaga	aatcggcgat	cgcggtgact	tctcccggcg	atcctccata	gtggagcagc	29580
aatacggcct	tggtcgcccg	cgtgatggcc	ctcgccacat	catccagcgt	ggggttcaac	29640
gtccgggggt	cgacgtcgca	gaacaccggg	cgggcaccgg	aggatgcat	ggcgttgccc	29700
gccgccacga	agcttatcga	aggaagtacc	acgtcgtcgc	ctgggcccag	gtcgagcacc	29760
tgcacggtaa	ggaacagcgc	ggcagtcctc	gagttgagga	acacgacctg	ttcgggatcc	29820
actcccaggt	ggtgggcgaa	ttcggcctcg	aacgtccggg	tgcgcggccc	gagcccgatc	29880
cagttggagg	cgaacacctc	cgcgatcgcg	tcgagttctt	cggtgccgag	gatcggtggt	29940
tgcaggttga	tcacgttgct	gaaatcctcc	gagatgccgc	catgctggat	gctaggaact	30000
cttggccacg	aattcagcga	ttgattcgac	gacgtagtcg	atcatttggt	ccgttatgcc	30060
tgggtagacg	ccgacccaga	aggttcggtc	ggtgacgatg	tcgctggttg	tgagcgcgtc	30120
ggcgatccgg	taccgcacct	gctcgaaggc	cgggtgccgg	gtgatgttac	cgccgaacag	30180
cagtcgggtg	ccgatgttgc	gggattccag	gaagttcacc	agggcggcac	gggtgaaccc	30240
ggcgtccgca	ctgatggtga	tcgcaaacc	gaaccagctc	gggtcgctgt	gcggtgtggc	30300
taccggcagc	agcaggcccg	gcaacccgga	cagcccttcg	cgcaaccgtc	gccagttacg	30360
gcggcgtgcc	gaccgcaatg	cggaaatctt	gctcaactgg	ctcagcgcaa	gtgcggcctg	30420
caggtcgggtg	gtcttgaggt	tgtaacgcac	gtgggagaac	gtgtacttgt	ggtcgtagcc	30480
cgggtggaagg	gtaccgaggt	ggtagtcgaa	cctcttgccg	caggtgttgt	ccacgccggg	30540
ctcgcaccag	caatcccgtc	cccagtcacg	cagcgactcg	atgatgagag	ccaattccag	30600
gctgccggtc	aacacgcagc	caccctcgcc	gctggtgatg	tgatgggcag	gatagaagct	30660
gaccgttgtc	aggtcgcgca	aggttcgggt	cagccgtccc	cggtaggtgg	atcccaccgc	30720
atcacagttg	tcttcgacga	ggaacagctc	gtgttctttt	gcgatctccg	cgatttcgtc	30780
agcggcgaa	gggttgccca	gggtgtgcgc	cagcatgatg	gctcgcgtcc	gttcctgtac	30840
ggcggccttg	atgcggtctg	gcgttgcggt	gtaggtgccc	agttccacgt	cgacgaatac	30900
cgggacgagt	ccgttttgga	ccgccggatt	gatcgtcggt	gggaagccga	ccgccgcagt	30960
gatcactctg	tcgcccggcc	gcagtcgtgc	ctcgcgagt	ttgggggagg	taagcgcaact	31020
cagtgccagg	agattggccg	acgaaccgga	ggtgacgaga	tgagccttgc	ggaggccgaa	31080
gaagcgggcg	aactcgctct	cgaatcgccg	tgcattcccg	cccgcggcga	tccggagctc	31140
cagcgcggct	tccaccagtg	ccaccgggtc	gtcctcgctc	agcacggcgc	ccgatggccg	31200
gatcggcgct	gatccagcca	cgaaggctcg	ggattcctgt	tcgcgggtgg	aatcgcgtac	31260
ggatgccaat	atccggtcct	tggcatccgg	caccatctca	gtagcggtag	cgcaagtgtc	31320
gtcacacgaa	gtcactctgg	cgcgcctttt	ccccagcgct	ctggttttcc	ggctctgcat	31380
gcaggcgacg	atcagtcctc	gcgccttgcc	ttcaggagat	gagcgatgcc	cgtggcgaa	31440
cgcgttatga	cgtcccagcg	ggacagtgtg	ctgtctcggc	gccttacacc	ttcctgccct	31500
ggttcgatgc	ggtgcgggac	atcaggacag	cggagcaagg	agaagcgctc	attgactcag	31560
aaatcctcga	tctacccggc	acacccgact	cggtagagcc	caggctagcg	ggaacgacct	31620
gctcgcgctt	gtcaagatcg	ctaccatcac	ctggaaggcc	taagattttg	cttgcgaaa	31680
cggcggtttc	cgggggatat	cagagatttc	tgtgattctt	ggcatgcttc	ccgggtgttc	31740
aattgcgac	ggagagttca	tgcgtgtcct	gttcaccccg	ctgccggcga	gttcgcactt	31800
cttcaacctg	gtgccgttgg	cgtgggcgtt	gcgtgccgcg	gggcacgagg	tccgtgtcgc	31860
catctgccc	aatatggtgt	cgatggtcac	cggagcagga	ctcaccgcgg	ttcccgtcgg	31920
cgacgagctc	gacctcatct	ccttggcggc	caagaacgaa	ctcgttctcg	gcagcggggt	31980
ctcgttcgac	gagaaggggc	ggcatccgga	actcttcgac	gagctgctgt	caatcaactc	32040
cggcagagac	acggacgccc	tggagcaact	ccaccttggt	gatgaccgat	cgctggacga	32100
tctcatgggg	ttcgccgaga	aatggcagcc	tgatctcggt	gtgtgggacg	ctatggtgtg	32160
ttcggggcca	ggtgtggcgc	gagcgtcggg	cgcacgacac	gtgcggatgc	tcgtcgccct	32220
cgatgtgtcg	gggtggctgc	ggtccggttt	cctcgaatac	caggaatcga	agccgcctga	32280
gcagcgcgtc	gaccgcgtcg	ggacgtggct	gggagcgaag	ctcgccaagt	tccgagccac	32340
gttcgatgaa	gagatcgtga	cgggccaagc	gaccatagat	ccgattccat	cctggatgcg	32400
cctgcctgtg	gacttgga	acatctcgat	gcgtttcgtg	ccgtacaacg	gtccggcggt	32460
ggtgccggag	tgggtgcgcg	aacgaccgac	gaagccgcgc	gtctgcatca	cgcgcgggct	32520
gaccaagcgg	cggctgagca	gggtgaccga	acagtacggg	gagcaaagtg	accaggaaca	32580
agcaatggtg	gaaagggtgt	tgcgcggcgc	ggccaggctc	gacgtcgagg	tgatcgccac	32640
cttgtctgac	gacgaagtac	gggagatggg	ggagttgccc	tcgaacgtcc	gggtccacga	32700
atacgtaccg	ctcaacgaac	tgctggagtc	gtgttcagtg	atcatccatc	atggctcgac	32760
gacgacgcag	gaaaccgcca	cggctcaacg	cgtaccgcag	ttgattctcc	ctgggacctt	32820
ctgggacgaa	tctcgtaggg	cggagctcct	agccgatcgg	ggagccggtc	tggctcctcga	32880

ccccgcgacg	tttaccgaag	acgacgtgcg	aggtcagctg	gcccgcctgc	tgcacgagcc	32940
gtcgttcgct	gccaacgcgg	cgctgatccg	ccgtgaaatc	gaggaaagtc	ccagcccgcg	33000
cgacatcggt	ccacgtctgg	aaaagctagt	tgccgaacgt	gagaaccgcc	gcactgggca	33060
gtctgatggc	catccgtgag	caacgtgtgg	ccggaaacat	ggacgcgggg	gtttggcagg	33120
tgttcatcgc	tgttgcgtcg	actcggatcc	cgccgtgacc	gggacgatgc	caggcgagtc	33180
ccgaagtcag	attcttgtcc	agaatcgtec	aatgggggtg	tgatctcccc	agaggtttgc	33240
gctccaaccg	atttccgacg	aggatcgtag	cgcccgtgga	gcaacgacta	ccgtgcggtc	33300
gagacatacc	gctgtgcgcc	aggagcgaag	gtgggttgcc	cgatcacccg	gctgggtgga	33360
gatgccgagc	cgaaggtcac	cttggatgag	gcggaagcct	ggcgagagca	caccgaggcc	33420
gtggccgacg	tccgtgtctt	ctccggcggg	catttcttca	tgaccgaacg	ccaggacgag	33480
gtgctcgcgg	tccttacggg	cggatcgctt	cgatgatcct	cgccaggccg	ctggaccaga	33540
ccgcgacgcc	cctgggagcc	ggcgtgcaca	tcgtcacggc	agtgagggat	tgggcatgag	33600
cagttctgtc	gaagctgagg	caagtgtgct	tgccgcgctc	ggcagcaaca	acacgcggcg	33660
gttcgtcgac	tctgcgctga	gcgcttgcaa	tggcatgatt	ccgaccacgg	agttccactg	33720
ctggctcgcc	gatcggctgg	gcgagaacag	cttcgagacc	aatcgcatcc	cgttcgaccg	33780
cctgtcgaaa	tggaaattcg	atgccagcac	ggagaacctg	gttcatgccg	acggtagggt	33840
cttcacggta	gaaggcctgc	aggtcgagac	caactatggc	gcggcaccca	gctggcacca	33900
gccgatcatc	aaccaggctg	aagtaggtat	cctcggcatt	ctcgtcaagg	agatcgacgg	33960
cgtgctgcac	tgccctcatgt	cagcaaagat	ggaaccgggc	aacgtcaacg	tcctgcagct	34020
ctcgccgacg	gttcaggcaa	ctcggagcaa	ctacacgcag	gcacaccgtg	gcagcgttcc	34080
gccctatgtg	gactacttcc	tcgggcgggg	ccgcggccgc	gtgctggtag	acgtgctcca	34140
gtctgaacag	gggtcctggt	tctaccggaa	gcgcaaccgg	aacatggtgg	tggaaagtcca	34200
ggaggaagtg	ccagtccctgc	cagacttctg	ctggttgacg	ctcggccagg	tgctggctct	34260
ccttcgtcag	gacaacatcg	tcaacatgga	caccgcggacg	gtgctgtctt	gcaccccggt	34320
ccacgattcc	gccaccggac	ccgaactagc	cgccctggag	gagcccttcc	gacaggcggt	34380
ggcaggttcg	ctctcgcacg	gcacgatctc	gtcagatata	tccgaggcgg	tcgggttggt	34440
cgaggaagcc	aaggcccgct	accgcttgcg	ggcaaccgcg	gttccgctga	gcagggtcga	34500
caagtgggat	cgcaccgata	ccgagatcgc	ccaccaggac	ggcaagtact	tcgcggtgat	34560
cgcggtgtcg	gtgtccgcga	ccaatcgtga	ggtcgccagc	tggacgcagc	cgatgatcga	34620
accgcgagaa	caaggtgaga	tcgcactggt	ggtcaagcgg	atcggcggag	tgctgcacgg	34680
tttggtccac	gctcgggtgg	aggctgggta	taagtggact	gcggaaatcg	ctccacagggt	34740
ccagtgcagt	gtggccaact	accaaagcac	cccgtcgaa	gactggccgc	cgttcttgga	34800
cgacgtgctc	accgcgcgatc	ccgaaaccgt	gcggtacgaa	tcgatcctgt	ccgaagaagg	34860
cggtcggttc	taccaggcgc	agaacaggta	ccggatcatc	gaggtgcatg	aggacttcgc	34920
ggcacgacct	cccagcgact	tccggtggat	gactttggga	cagttgggcg	agctgctccg	34980
gagcacccac	ttcttgaaca	tccaggcgcg	cagcttggtc	gcctccctgc	atagcttgtg	35040
ggcgttgggg	cgatgaccag	ctcgatgcga	aagccgggtg	gcacgggtgt	gctcgggtgc	35100
gcttccttcg	cgtggcgacg	gatgctgccc	gcgatgtgcg	acgtggccga	aacagagggtg	35160
gtggcgggtg	cgagccgtga	tccggcgaaa	gccgaacggg	tcgcagcgcg	attcgaatgc	35220
gaggcgggtg	tgggttacca	gcggctcctg	gagcggccgg	acatcgatgc	cgtctacgtg	35280
ccgttgccgc	ctggcatgca	tgacagtggt	atcggcaagg	cgcttgaggc	agacaaacac	35340
gtgcttgccg	agaaaccgct	gacgacgacg	gcgtccgaca	ccgctcgccct	ggtcgggctg	35400
gccaggagga	agaacctgct	gctgcgggag	aattacctgt	tcctccacca	cggccggcac	35460
gacgtggtcc	gcgacctgct	gcaatccggg	gagatcggtg	agctccggga	gttcaccgcc	35520
gtgttcggaa	ttccgcgcgt	tcccgacacg	gacatccgct	atcgcaccca	actcgggtggc	35580
ggagcgttgc	tggacatcgg	tgtctatccc	gcccgtgccg	ctcggcactt	tctcctcggt	35640
ccgctcacgg	ttctcggcgc	aagctcgcac	gaggcccagg	agtcggggcg	cgacttgtcg	35700
ggcagcgtgc	tgctccaatc	ggaaggtggc	accgttgccc	acctcggata	cggtttctgtg	35760
caccactacc	gcagcgcgta	cgagctgtgg	gggagtcgtg	ggcgaatcgt	cgtcgaccgg	35820
gcgttcacgc	cgcccgccga	gtggcaggcc	gtgatccgaa	tcgagcggaa	gggcgttggtc	35880
gacgagttgt	ccttgccagc	ggaagatcag	gttcgcaagg	cggtcaccgc	cttcgcacgc	35940
gacatcagag	cagggacagg	cgtggacgac	cctgcgggtg	ccggagattc	gggcgaatcg	36000
atgatccagc	aggccgcgct	ggtggaggcg	atcggtcagg	cccgtcgggtg	cgggtccaca	36060
tagccgcccc	gcacccgcgg	gtagtagttc	gcctcgaagc	ctgaccgggc	atccggaagc	36120
cagcggggaa	gccgctggag	aggctcaccg	ccatccgctc	acctggcatc	tcgcggaccg	36180
ctgatcgcgg	acggctcgga	gaagtgtctg	tcgaaccacg	agacgaccac	tcgcgagctg	36240
gccagggcgg	cgggaaagtg	agccaatccg	gagagcggat	gccaccgcac	tggcgtaccc	36300

gccgcgcggt	agctgtcccg	gagtcgctcg	ccgaatgcga	acggaacgat	ctcgtcgtcc	36360
gtgctgtggt	agacgagcgt	ggggaccacc	ggggccaccgt	tcctacctgc	gacgcttttcg	36420
gccagtcgtg	cgcgccatcg	aggttgctcg	aaaaggcccg	aagtgtcgag	gaagtgcgtc	36480
agctcgcggc	cgaggaagcg	ggtgacgagc	tccggtgcac	cgagctcgcg	cacttgatca	36540
acggcggtag	gacccgcttc	ggtgagaagc	tcgtcgaatg	gcagatcggg	gtaggcagcg	36600
gcatgcccga	ccaggccggc	cagcaccggc	ccggtgaaca	ccccgtcatt	tcggtggatg	36660
atgtccagca	gatcgatcgg	caccgcacct	gcggccgcag	cgcggttcg	cagttcaggt	36720
gcgtaggtgg	ggtgcagttc	gccggcgaag	gccgacgctt	gcccaccctg	cgcatagccc	36780
cagatgccga	ccgggcagtc	ggttcgtcag	ccggagcccg	gtagccggtg	cgcagcgcg	36840
gcggcatcga	gcatggcggtg	tccctgcgcc	ctgcgacgg	tgtaggtgtg	ggttccagga	36900
gtaccgaggc	cttcgtagtc	ggtgatgacc	acggcccacc	cgcggtcgag	ggccacggcg	36960
atcagctcgg	tctccggctc	ggttccgggt	cgaagcaggt	acgacggggc	aacttggtta	37020
ccgaggccgt	gggtgcccac	tgcgaaagtg	atgatggggc	gatcttcgcg	cgccacgggg	37080
atgttcggca	ccagaacggg	gccggagacg	gcgttcggca	tgccaaaggc	ggagttggac	37140
cggtagagga	tttgccaggc	cttggtcgcg	acgggttcgc	ccgtgcccg	cagtgccgag	37200
acgggcccgg	ccctgaggag	cgtgcccggg	acaccggcg	gtagcggcgt	cggcggtcgg	37260
tagaagggat	catccgcggg	tccccgcaga	tcgtcgccga	ccaggctggc	gtgctcggag	37320
gccatcagga	ctgcttcttt	cgagcctgca	ggagcatgaa	acccatgctt	tcctcgtttc	37380
tggcgtaatc	cggatgtttc	cggtattccg	caaccgcggc	gatcagctgt	gctgggtccc	37440
gtccgtgctt	cgccgcgatg	tctcccaagt	agcgttgctg	gtaggtgccg	acagccgcag	37500
gctcgacgcc	ggcgagctca	tcgagtttcc	ggagcaactc	gtcgacgtac	caggagacca	37560
tgcacctggt	ctgtgccgtg	aggtcgggtg	cttcgagaat	ctcgaaccgg	gcttcgctga	37620
ccagcgccgt	gaagctgttc	aaggatggtg	cggtcgtgcc	cgtccaaacc	gccgcgtact	37680
cttcggggag	tcgaaccgga	gtgatgatgt	ctccgaggac	gaaccggccg	ccgggttcca	37740
ggattcgggtg	gacctcgagg	atcgcgggcg	cctgggtccac	gatctgcacg	acggactgca	37800
tcgcccacga	ggcctgaaag	aaaccgtccg	ggttagggcg	ctgggcggcg	tcgactagat	37860
cgaactcaag	actgccggcc	agtccggtct	cgttggcgag	cctgggtggcg	gcggcgagat	37920
gctgggcggt	cacgggtgatt	ccgggtgactc	gaacgcgcgt	ggcgcatgcc	gcacggacta	37980
cggtgtcccc	attgccgcag	cccaggctga	acagggtgcg	tccgggacgg	agcgcgccct	38040
tgtcgatgaa	cagggtcggtc	agttgggtcg	cagcatccga	ccacgggtgtg	gcaccggcat	38100
cctcccagata	cccgcccgcc	cagtaaccgt	ggtgcagggg	acgcccgtgc	gccaacgcac	38160
cgaagatgga	ctccacctga	tccgcgggtc	gaaatgcctg	tgtgttcgcc	cctctgctgt	38220
tcactcgctc	tccgcgctgt	tcacgtcggc	cagggtgcaat	atgtcgtcca	gactccttgg	38280
cacccaagca	ggaacgccgc	cttcggcggt	gacgcctttc	tccaggaacg	cgatgtttgt	38340
gtaggtgtgg	aggccgacca	aattgcgttc	caggtagctc	ggctcgtacg	agcccgcatg	38400
cggtgtctcc	tcgtgtcgaa	cgcttccaa	caggttcttg	agcaggctga	ccgtgggtgcc	38460
gggtgcggcc	gggcactgcg	cctgcccgcg	gaatccggga	gcataaggctg	tccacagatc	38520
ctcgatcacg	tatagccac	cgctgcgcaa	ccgggggaac	agcgtttcca	gggatgtgcg	38580
cacgtgtccg	ttgatgtggc	tgccatcgtc	gatgatgatg	tcgaacgggtc	cgtacttgtc	38640
gtcaacggcg	gccagctcct	cggtcttgct	ctggtcggcg	cggacgggtgc	agagcctctg	38700
ctggtcgagg	aaggacttgt	cgaaaacgtc	catcccgaac	acgaggccgc	ggtggaagta	38760
gcgcttccac	atcttcaggg	attcgccgcc	gccaccgtcg	aagttgtagc	caccgacacc	38820
gatctccagg	atgcgcaccg	ggcgatcacg	gaactcgccg	agggtgtcgct	cgtatagcgg	38880
ggtgaaccag	tgcaggccgc	cccacttgtc	cgtgcggtag	tgggaggcga	gcaagttgag	38940
gtcgggacgt	cggtgcccgc	agccggcgac	cactgcggag	atggcctgga	agccatcgga	39000
cagttccgac	ggaccgggta	tcgaaccgga	tgtggtggtt	cggaggaagt	tgggtgctccg	39060
ggcgccgacg	gccctgggag	ctcctgggcc	gaacaactcg	gcgatgagat	cggtgagctc	39120
gtaaccgatc	cgcagcggga	cgtctccgac	cggtcgttgc	tccgccttga	tcagctcacc	39180
ggactgtagc	gtcaggacga	agtcaacggg	ctcgcctcgg	tgggtgatct	ggaccgcgac	39240
ctcggtccgt	tcgatgtcgg	gggcccgttc	cgcgcggaag	aggatctcgt	cgatcagcac	39300
gggtgcgatc	ctggcgagtc	cgagttcggt	ggtcaggctc	gccaggctcg	ccgcactgga	39360
tccggcggcg	aggatgatgc	gttccacggg	ttcgatctcg	tgcgttgtgg	acatcgtgat	39420
gagctcctca	tgggtgaccg	ggtgaaagcc	gtgccggcgg	tttgatcgac	aggccgtgct	39480
ggaagatggt	ctgcggatcc	caccgcgctt	tggcccgcgtg	cagccgcggg	tagttgtctt	39540
tgtagtacag	gtcgtgccag	gcaacaccgg	aggtgttcca	caatggatcg	gccaagtcgg	39600
tgtccgggta	gttgatgtag	gagccgtcga	cacgggtacc	tggcaccgga	actccgcggg	39660
tttcggcgta	catctcgcg	tagaaaccgc	gaatccaggt	cagatgccgc	tcgtcctcgg	39720

cggggtccga	ccagttcgtg	acgaacagcg	ctttgagaac	cgagtcgcgc	tgagcgagtg	39780
cgggtggccga	cggagccacg	gcattcgcca	taccgccgta	accgagcagc	aacagcgccg	39840
ccgcaggggtt	gtcgtatccg	tagacgggtca	gccgcgggta	aaccgtgggt	agttgagctt	39900
cggacagccc	ggtgcgcaag	taggcggcctt	tgaccttgggt	ccgttgcatg	cccggttcgc	39960
cgccttcggc	gatcgccccg	gccacctggg	tcgatcgcaa	ccacggcagg	gtttcccgcga	40020
gccccttcggc	tggagtcacg	ccgacctggg	cgttgatcgc	cgacaggtgt	tcggccagggt	40080
tgcgttccgc	gttcggatcc	gtgccgtcca	ggtgaacggt	cagcgtgacg	tagccagctt	40140
gccggtgtgc	gcagacgagc	gtgctgaaca	acccgagttg	cgtggattca	ggcgcgctgt	40200
gctgctcgta	ccaattgccg	aagttctgta	ggagcacggc	gaatgactgc	tctgtcagtt	40260
cgtgccacgg	ccagtggaac	gatcggagca	gcactgtcgc	gggcggccgt	ggcaggagct	40320
ctgcggcgtc	ggtgctgacc	acgtccggcg	ttcggagcca	aaacctgggtg	acgatcccga	40380
agttgccgcc	accgccaccg	gtgtgcgccc	accacaagtc	gtgaccggcg	cccgtggagt	40440
tcgggtcggc	ctcgacgatg	tgactttcac	cggcctgggtc	gaccacgacg	acctcgacgc	40500
cttgaaggta	gtcgacgacc	gaaccgaatc	ggcgcgacag	cgggcccgtat	cccccgccga	40560
ggatgtgccc	gcctgcgccc	accccgggac	atgcgcgggt	cgggatcgtc	acgccccagt	40620
tcttgaacag	ggttcgggtac	acctgcccga	gggcggcgcc	cgcctcgatc	gcgaatgccc	40680
cgcgcgtgct	gtcgtagtac	acgcggttga	gctcggagag	gtcgacgagc	actcggatcg	40740
ccgggtccgc	aacgagattc	tcgaaagcagt	gcccgcggct	gcggacccct	acccgcctgc	40800
cgggtgcgcac	ggcgtcggcg	acggcgtgca	cgacgtcttc	ggcggagctg	gcgatgtgga	40860
tgcgttcggg	ttttccgggtg	aaacgggggt	tgtgcccga	gacgaggtcc	ggataacgag	40920
gatcgtcggg	ctcgacgggtg	atctctgttc	ctgggggttcg	acgattcatg	ggtgccgggt	40980
catggaattc	gggcaccgcc	cctccttttc	tgactgggtcc	actttgttcg	cccgcagccg	41040
agatcatcta	cgcgtccggg	tgattatctg	tgtgtttcag	ctcatacgtg	aaaccgggtc	41100
gcctccgccg	gctctacttt	gtggatcgat	atcgcgggtgc	gcatggtgcc	gtatgcgctg	41160
gaaccgaaaa	ggtgatgact	ttccatgagt	gagatcgcag	ttgccccctg	gtcgggtggtg	41220
gagcgtttgc	tgcctcgggc	gggtgcgggc	cggcgcaagc	tccaggaagc	agtgcagggtg	41280
gccgacttgg	acgcggtggc	cgacgccatc	gtcgacgaac	tcgtcgtacg	ctgcgatccg	41340
ctgtcgttgg	acgagtcgggt	gcgaatcggc	ctggagatca	cttctggcgc	tcagctgggtc	41400
cggagaaccg	ttgagctcga	tcacgcaggc	ctgcgggtcg	cggcgggtcgc	cgaagcagct	41460
gctgtttctcc	ggttcgacgc	ggtggatctg	ctggaagggc	tcttcggccc	ggttgacggc	41520
aggcggcaca	acagccgtga	agtcgcgtgg	tcggacagca	tgacgcagtt	ctcgcccga	41580
cagggcctcg	ccggcgcgca	gcgcctgctg	gcgttcggga	acaggggtgtc	caccgcgggtg	41640
cacgccgtgc	tggccgcagc	cgccaccagg	cgcgcggacc	tcgggtgcgt	ggcagtcgcg	41700
tacggatccg	acaaatgggc	ggacctgcac	tggtagaccg	aacactacga	gcaccacttc	41760
tcccgatccc	aggatgcccc	ggtgcgagtg	ttggaaatag	gaatcggtgg	ttatcacgca	41820
cccgaactcg	gtggtgcttc	gctgcgcagt	tggcagcgggt	acttccggcg	aggtctcggt	41880
tacgggctgg	acattttcga	gaaagccggg	aacgaagggc	accgagtgcg	aaagctgcga	41940
ggtgaccaga	gcgatgcgga	attcctggaa	gacatggcgg	ggaagatcgg	gccgttcgac	42000
attgtcatcg	acgacggcag	ccatgtcaac	gaccacgtca	agaaatcctt	ccaatccctg	42060
tttcgcgcag	tccgcccagg	tggtttgtac	gtcatcgagg	atctccagac	ggcgtactgg	42120
ccgggtacg	gcggtcgcga	tggggaaccc	gcggcccagc	gcacctcgat	cgacatgctc	42180
aaagaactga	tcgacggcct	gcattatcag	gagcgcgaat	cgcggtgcgg	gaccgagccc	42240
tcctacacgg	aacggaacgt	ggcgccctg	cacttctacc	acaacctgggt	attcgtggag	42300
aaagggtca	acgctgagcc	tgccgcgcgg	gggttcgtgc	cccggcaagc	gctcggcgtc	42360
gaggacggct	gagccgttca	ccagctgcgg	cgccagtagg	cgcccgtgcc	gtcgatgtcg	42420
tggatgggtt	ccgtgatccc	gagttccgcg	cggaaacctt	tcaccgcgtc	ctggcaggac	42480
ggcagaaaaat	agtcgtcgat	gatgacgaat	ccgcccggcg	agagcttcgg	gtacaggttc	42540
cgcaatgagt	ccattgtgga	ttcgtagagg	tcgccgtcga	gtcgtagcac	ggcgagttcc	42600
tggatggggg	cgggtgggcaa	ggtgtcccgg	aaccagccgg	ggaggaacct	gacctgttcg	42660
tcgagcagcc	cgtagcgggc	gaagttctgc	cggacgggtct	caagcgatac	gccaagcacg	42720
tcgttgtact	cgtgcagcgc	catagcctgg	tccgcttgggt	ggtcttgccg	agagctttcc	42780
ggcattccct	ggaaggaatc	cactaccag	acggtacgtc	cggtatctcc	gaatgcctgg	42840
agaaccgcgc	gcataagat	gcatagcgcc	ccccgccaga	caccggtctc	ggcgaaatcc	42900
ccgggaacac	cgtctgcgag	cacggcttcc	acgcagtgct	ggaggttgtc	cagccgctcc	42960
agaccgatca	tcgtgtgcgc	gacagttggc	cagtcctgtc	ctttggcccc	agcggcctgc	43020
ctgtagtccg	tgttgtcctg	ccaggcgttc	ggatgcggcc	gatcactgta	aatcgtgttg	43080
gtgagtacct	tcttgagcag	gtccaggtag	agcgcgttct	gggagggcat	cggttctccg	43140

gatccagctg	ttctcgggtg	actagttcat	caggcacgga	tggccgcagt	gttctccagc	43200
gtccgcacca	gcgcgggcggg	atggggcatg	gccgtgatct	cgtcgctgag	tttgattgcc	43260
gcagcagcga	agccggtgtc	gccgagcacc	gttgcgattg	agtcggtgaa	ctgttcgtgg	43320
tcggactggg	cctgtctcat	cggcaagcag	atgcccgccc	cggcagcggc	gaggttgccg	43380
gcgtagtcca	actggtcgaa	gtactgggga	agcacgagtt	gcgggatgcc	gagtcgggtc	43440
gcggtgaatg	ccgttcccga	gccgcccgcg	cagatgacca	gctcgcaggt	acgcaggaac	43500
aggttgagcg	ggaccgattc	ggcgatccgg	gcgttgtcgg	gtaggtcggg	gagaagtgcc	43560
cgggtgtcgg	ggggaacggc	gatcacggcc	tcgacgcggg	gcaactcggg	ggcagccgct	43620
actgcgcgca	gcagcggagc	cggccccggg	gcgttcagca	ccatgcggcc	catgcagatg	43680
cagacccgcc	gtgtcgaggt	gcgcgcgcg	ccccatgcg	ggaatgcgcc	gcttccgttg	43740
tacggcacgt	actggaccgg	tgcgccttgc	ggcgcgtcgc	ttgcttgca	gctcggcgga	43800
cagggatcca	ggatgagctc	gggagtgggc	aggccgggtc	gtccgtgggt	ccggcacacc	43860
gggtcaagca	actcgtgggc	tcgatcgctg	aaggggcctg	cgggtggggc	gactccccag	43920
cgggtgcagca	cgaccggcag	gtcgagcaat	ccgcccagca	cccgcccgat	cagcgcgcag	43980
acgtcgacca	acagcactga	cggtcgccag	gcctcggcca	gtcgaaggta	ttcggggagc	44040
tgatcgagcg	agctttgcgc	gacattggac	gcggtctgct	cccacagttg	ccggcctgcc	44100
tcggtgtcgc	gctgaccgaa	cgccggattg	ggaaagcgca	gctgcgtggg	tccacccgta	44160
tcgccgggtcc	tgtcgttccc	gcggatcccc	gccgtgggtg	gacctgcacc	atgcgcggtc	44220
gcctgcagct	ctggtgggtg	ggcgatcagg	acctcgtgcc	cggatgcttg	cagcgcgccag	44280
cacagcggca	ccattgccat	gagatgcgtc	ggatagggca	agggaaacgac	gagtacgcgc	44340
atacttcgga	ccccagtcct	tttcccccca	ttagcgcagc	agccccctact	cccattggcc	44400
aggatttgga	aaatgcgctg	cgatatgtcg	tcgccgttga	cgccaacagg	acttccggcg	44460
gcaacaatag	tgtgtcacgg	caggaatgtc	acgcgaccat	cgaagatctt	tgggtcgccg	44520
cacctgggtt	cacgcgaacg	agtgaatgc	gcgagctccg	ctcgatcggg	gtgggcccga	44580
cctgtacggg	gatcaccggt	ggttctgcgg	ggattcatgg	ggaagatttg	cgctggctgt	44640
ttgcctcctg	cgcggatcgt	tatagtcggt	accgcgcgat	gcggcggtta	ccgcgaatta	44700
actgacggct	agtttgccgt	cttttctctc	tgtgtgttcc	ctgctcgggt	ccagaaaatt	44760
acgagaagg	gaacgttgca	gagatcaggc	ataccgggtg	tgccagggtg	cgcaccaaca	44820
tcgcagcagg	ttgggcagat	gtatgacctg	gtcacgccgt	tgctgaactc	ggtcgcgggc	44880
ggccccctgc	ccatccacca	cggctactgg	gagaacgacg	ggcgggcttc	ctggcagcag	44940
gccgcccagc	ggctcaccga	ccttgctgcc	gaacggaccg	tgctcgatgg	cggcgttcga	45000
ctgctcgatg	tgggggtcgg	taccggacaa	ccagcgtgct	gcgtcgcgcg	cgacaacgcg	45060
atccagatca	ccggcatcac	cgtcagccag	gtgcaagtgg	ccatcgccgc	tgattgcgca	45120
cgcgaaacgc	gactaagcca	ccgggtggac	ttctcgtgcg	tcgatgccat	gtccctgccg	45180
taccgggaca	atgctttcga	cgcgcctggg	gccatgcagt	cgctgttgga	gatgtccgaa	45240
ccggaccggt	ccatccggga	aatccttcga	gtactcaaac	ccggtggcat	cctcggcgct	45300
accgaggtcg	tcaaacgaga	agcggggcgg	gggatgccgg	tgtccgggga	caggtggccg	45360
accggccttc	ggatctgcct	ggctgagcaa	cttctggaat	cgctgcgtgc	agcgggggtt	45420
gagatcctcg	attgggagga	cgtgtcgtcg	aggaccgggt	acttcatgcc	gcagttcgcc	45480
gaagagctcg	ctgcgcacca	gcacgggatc	gcggacaggt	acgggcccgc	tgtcgccggc	45540
tgggcccgcg	cggctctgca	ttatgagaaa	tatgcccacg	acatgggcta	tgcgattctg	45600
acggcgcgga	agccggtcgg	ctgagggcgc	gccgcaattc	gatgacgttc	atgcgccgtg	45660
tcggggaaatc	gccgggtggc	gcgccagcag	aggctgaact	tactgggtgg	gtgtccagga	45720
atcgaggagg	cagtaccgaa	tgagcgaagc	cgggaacctg	atagccgtca	tcggactgtc	45780
ctgccgccta	ccccaggcgc	ctgaccgggc	ttccttctgg	cggttgctgc	gcaccggaac	45840
ggacgccatc	accacgggtc	cggaaaggcg	gtggggcgac	ccgttgccct	gtcgggatgc	45900
gcccgaaggc	ccggaatggg	gtggtttctc	ggctgatgtc	gactgcttcg	atcccagatt	45960
cttcggggatc	tcgccgcgag	aagcggcagc	cgtggatccc	cagcagaggc	tggctctgga	46020
gctcgcctgg	gaggcactcg	aagacgcggg	tatccccgcc	ggcgagctgc	gcggtactgc	46080
cgccgggtgtg	ttcatggggg	cgatctctga	cgactacgcc	gccctgctgc	gcgagagccc	46140
gccggaagtg	gctgcgcagt	accgcctcac	cggcaccat	cgaagcctga	tcgccaaccg	46200
cgtgtcctat	gtgctcggcc	tgcgcgggcc	aagcctgacg	gtggattcag	gtcagtcctc	46260
gtccctgggtc	ggcgtgcata	tcgccagcga	gagcctgcga	cggggtgagt	gcacgatcgc	46320
actcgcgggc	ggcgtgaacc	tcaacctggc	cgccgagagc	aacagcgctc	tgatggactt	46380
cggcgcgctc	tccccggacg	gtcgtgtgct	caccttcgat	gtgcgggcca	acggttacgt	46440
ccgtgggtgag	ggcggcgggc	ttgtcgtgct	gaagaaggcc	gatcaggcgc	acgccgatgg	46500
cgaccggatc	tactgcctca	tccgcggcag	cgcgggtcaac	aacgatgggg	gcggtgccgg	46560

gctcaccggtt	cgggcggcgg	acgcccaggc	ggagctgctg	cgccaggcat	accggaacgc	46620
gggcgtcgac	cgggcgcgcg	tgcagtatgt	cgagctccac	ggcagcgcg	ccaggggtcgg	46680
ggatcccgtc	gaagcagcag	ccctcggagc	tgtcctgggg	gcggcgagac	ggcccggcga	46740
cgagctgcgt	gtgggggtcgg	cgaagaccaa	cgtcggccat	ctggaagcag	cgggcggcgt	46800
caccgggttg	ctgaagaccg	cactcagcat	ctggcaccgc	gaactgccgc	cgagtcttca	46860
tttcaccgcc	cccaaccggg	aaatcccgtc	ggacgaattg	aacctacgcg	tccagcgtga	46920
tctgcgcccg	tggccggaga	gcgagggggc	gctgctggcc	ggcgtcagcg	ccttcggaat	46980
gggaggcacg	aactgccacc	tggtgctctc	cggcacgtcc	cgggtggagc	gacggcgcag	47040
tggaccgcgt	gaggcgacca	tgccgtgggt	cttgcggccc	agaacaccgg	tcgcattgcg	47100
tgcgcaggcg	gcgcgcttgc	acacgcacct	caatacggcc	ggtcaaagtc	cgttggacgt	47160
cgcctactca	ctggcgacca	ctcgatccgc	gctgcgcgac	cgggcgcgcg	tggtcgcgga	47220
cgacgaaccg	aaactgctcg	ccgggttgaa	ggccctcgct	gacggcgacg	acgcgcccac	47280
gctgtgccac	ggcgcgactt	ccggcgagcg	ggcagcggtc	ttcgtctttc	ccggacaggg	47340
cagccagtgg	atcgggatgg	gtaggcagct	gctcgaaacc	tccgaggttt	tcgcgcgctc	47400
gatgtcggac	tgcgcgcgacg	cattggcgcc	gcacctggat	tggtccctgc	tggatgtgct	47460
gcgcaacgcg	gccggcgctg	cgcaccttga	ccacgacgat	gtcgtccagc	ccgcgctgtt	47520
cgccatcatg	gtctcgtctg	cggagctctg	gcgttcgtgg	ggcgtgcgtc	cggtggcggg	47580
cgtcggggcac	tcgcaggggg	agatcgcggc	ggcctgcgtc	gccggggccc	tgtccgtccg	47640
cgatgccgcc	aggggtgggtg	cgggtgcgcg	caggcttctg	acggcgctgg	ccggcagtg	47700
cgcgatggcc	tcgttgagc	atcccgcgca	agaggtgcgg	caaatcctgt	tgccctggcg	47760
cgatcggatc	ggcgtggcgg	gggtgaacgg	accgtcgtcg	accctggtgt	caggggaccg	47820
ggaggcgatg	gcggaactgc	tggccgagtg	cgcgacccga	gagctccgga	tcgcgccgat	47880
tcccgttgaa	tacgcctccc	attcgccctca	catcgaggtt	gtccgggatg	agctgctggg	47940
gctgttggcg	ccggtcgaac	ccaggacggg	aagcatcccg	atctattcga	cgacgaccgg	48000
ggacctgctg	gaccggccga	tggacgcgca	ctactggtac	cgcaaccttc	gtcaaccggg	48060
gctgttcgaa	cggcccgctg	aggccctggt	gaagcggggg	tacgacgcac	tcacgcagat	48120
cagcccacac	ccgggtgctga	ctcgcaacac	ccaggaaacc	gccgtgcgag	cagggcgagg	48180
ggtagtgggc	ctcgggacac	tccgcgcggg	cgaaggtggc	atgcggcagg	cgctgacgtc	48240
gctggccaga	gcacacgtac	acggagtggc	cgcggactgg	cacgcggtct	tcgccgggtac	48300
cggggcgcag	cgggtcgacc	tgccgacgta	cgcctttcag	cgacagcgct	actggctgga	48360
cgcgaagctt	cccgcgctcg	ccatgcccga	gagcgacgtg	tcgacggcgt	tcggggaaaa	48420
gctgcgggtc	tcgcgcgagg	cggacgtgga	ctcgacgacc	ctcacgatga	tccgggcaca	48480
ggcagccgtg	gtcctcggcc	actccgatcc	gaaagaggtg	gacccggatc	ggacgttcaa	48540
ggacctgggc	ttcgattcct	cgatggtggt	cgagctgtgc	gaccgcctaa	acgccgccac	48600
aggtctgcga	ctcgcaccga	gcgtcgtttt	cgactgtcct	acgccggaca	agctcgcccg	48660
ccaggtacgg	acgttggtgt	tgggcgagcc	ggctcccatg	acgtcacacc	ggccggactc	48720
cgatgcggac	gagcctatcg	ccgtgatcgg	gatgggctgt	cggtttcggg	gtgggggtgc	48780
ctcgcgccag	gagttgtggc	agttgggtcg	cgtcgggcgg	gacgtcgtgt	ccgagttccc	48840
ggctgaccga	ggttgggacc	tggagcgtgc	ggggacatcg	cacgtgcgcg	ccggcggggt	48900
cttgcatggc	gccccggatt	ttgaccccgg	gttcttcggg	atttcgccgc	gcgaggcgtt	48960
ggcgatggat	ccacagcagc	ggttgctgct	ggaaatcgcc	tgggaagcag	tcgaacgagg	49020
cgggatcaac	ccgcagcacc	tgcacggaag	tcaaaccggg	gtcttcgtcg	gcgcgacctc	49080
cctggactac	gggccacgcc	tgcacgaagc	gtccgaggag	gcggccgggt	acgtgctcac	49140
cggcagcacc	acgagtgtgg	cgtcgggtcg	ggttgcgat	tcgttcgggt	tcgaggggcc	49200
tgcggtgacg	gtggatacgg	cgtgttcgtc	gtcgttggtg	gccctgcatt	tggcgtgtca	49260
gtcgttgctg	tcgggtgagt	gtgatctggc	gttgggcggg	ggtgtgaccg	tgatggccac	49320
gccgggggatg	ttcgtggagt	tttcgcggca	gcgtgggttt	gcgccggatg	ggcgggtgca	49380
gtcgttcgcg	gaggccgcgc	acggcaccgg	ctgggtccgag	ggtgctggcc	tggttctact	49440
ggagcgggtg	tcggatgccc	ggcggaatgg	gcatgaggtg	ctggcgggtg	ttcgtggtag	49500
tgcggtgaat	caggacgggtg	cgtcgaatgg	tttgaccgcg	ccgaatgggt	cgtcgcagca	49560
gcgggtgatt	gcccaggcat	tggcgagtgc	ggggttgtcg	gtgtccgatg	tggatgctgt	49620
ggaggcgcat	gggacgggca	cgcggcttgg	tgatccgatc	gaggcgaggg	cgctgatcgc	49680
cacctacggc	cagggccggc	ttccggaacg	gccattgtgg	ttgggctcga	tgaagtcgaa	49740
catcggtcac	gcgcaggcag	ctgcggggat	agccggcgct	atgaagatgg	tgatggcgat	49800
gcggcacggg	cagctaccgc	gcacgttgca	cgtggatgag	ccgacttctg	gggtggattg	49860
gtcggcgggg	acggttcaac	tccttacgga	gaacacgccc	tggcccggga	gtgggtcgtgt	49920
tcgtcgggtg	gggggtgtcgt	cgttcgggat	cagtgggtact	aacgcgcacg	tcactcctcga	49980

acagcccccg ggagtgccga

50000

<210> 2

<211> 50000

<212> DNA

<213> *Saccharopolyspora spinosa*

<400> 2

```
gtcagctctgc gggggccgggt tcgggctctg tcgtggatgt tccggtggtg ccgtggatgg 60
tgtcgggcaa aacacccgaa gcgctatccg cgcaggcaac ggcgttgatg acctatctgg 120
acgagcgacc tgatgtctcc tcgctggatg ttgggtactc gctggcggtg acacggtcgg 180
cgctggatga gcgagcgggt gtgctggggg cggaccgtga aacgttggtg tgcggtgtga 240
aagcgtctgc tgccggtcat gaggcttctg ggttggtgac cggatctgtg ggggctgggg 300
gccgcacggt gtttgtgttt tccggtcagg gtggtcagtg gctggggatg ggcggggggc 360
tttaccgggc ttttccgggt ttcgctgctg cctttgacga agcttgtgcc gagctggatg 420
cgcacatctgg ccaggaaatc ggggttcggg aggtggtgtc cgggttcggat gcgcagttgc 480
tggatcggac gttgtgggag cagtcggggt tgttcgcgtt gcagggtggc ttgctgaagt 540
tgctggattc gtgggggggt cggccgagtg tgggtgtggg gcattcgggt ggcgagttgg 600
cggcggcggt cgccggcggt gtggtgtcgt tgtcgggtgc ggctcgggtg gtggcgggtc 660
gtgcccgggt gatgcaggcg ttgccgtctg gcggtgggat gctggcggtg cctgctggtg 720
aggagctggt gtggtcgttg ttggccgata agggtgatcg tgtggggatc gccgcgggtc 780
acgctgcggt gtccggtggt ctctctggtg atcgggatgt gctcgatgac cttgccgggtc 840
ggctggacgg gcaagggatc cggtcgaggt ggttgccgggt gtcgcacgct tttcattcgt 900
atcggatgga tccgatgctg gcggagttcg ccgaattggc acgaaccgtg gattaccggc 960
gttgtgaagt gccgatcgtg tcgacctga cggagacct cgatgacgct ggcaggatga 1020
gccccccga ctaactgggt cgtcaggtgc gagagccggt ccgcttcgcc gacggtgtcc 1080
aggcgtggt cgagcacgat gtggccaccg ttgtcgagct cggtcggac ggggcgttgt 1140
cggcgtgat ccaggaatgt gtgcgcgcat ccgatcacgc cgggcggctg agcgcgggtc 1200
cggcgatgag caggaaccag gacgagggcg agaaggtgat gacggccctg gcacacgtcc 1260
acgtacgtgg tgggtgcggt gactggcggt cgctcttcgc cgggtacaagg gcgaagcaaa 1320
tcgagctgcc cacctacgcc ttccaacgac agcgggtactg gctgaacgag ctgctgaat 1380
cttcgcggcg cgacatgggc aggcgtgtcg aagcgaagtt ctggggcgcc gtcgagcacg 1440
aagatgtgga atcgcttgca cgcgtattgg gcattgtgga cgacggcgct gctgtggatt 1500
ccctgagaag cgcccttccg gtgttgcccg gttggcagcg aaccgcgacc accgagttca 1560
ttatggatca gcggtgttac cgaattggct ggcggcaggt agccggactc ccgccgatgg 1620
gaactgtttt cggtaacctg ctggtcttcg cgctcatggt ctggtccagc gaaccggagg 1680
tgggtgactg cgtaacggca ctgcgggcac gtggtgcctc ggtggtgttg gtggaagctg 1740
atcccgaacc gacctcttc ggcgaccggg tacgaaccct gtgttcgggc cttccggatc 1800
ttgttgccgt gttgtcaatg ttgtgcttgg aagaatcgggt cttccggga ttttctgagg 1860
tgtcacgggg ttttgcggtg accgtggagt tgggtcgggt tttgcgggca gctggtgcca 1920
ctgcccgggt gtggttgctg acgtgtggtg gcgtgtcgggt gggagatgta ccggttcgtc 1980
cagcgaggcc cctggcggtg ggggtggggc gtgttggtgg gttggagcat ccgactggt 2040
ggggcggtt gatcgatatt ccggtcttgt tcgacgaaga cgctcaagag cggttgtcga 2100
ttgtgctggc aggtctcgat gaggacgagg tcgcatccg tcctgacggc atgttcgcgc 2160
gtcggttggt acgccacact gtctcagctg atgtgaagaa ggcgtggcgc cccaggggat 2220
cgggtgctggt gacgggcggc acgggtggtt tggggcgcca cgttgctcgc tggctggccg 2280
acgccggagc cgaacatgtg gcgatggtga gtcgacggcg cgagcaggca ccgagtgtg 2340
agaagttgag gacggaactg gaggatctgg gtaccgggt gtcgatcgtg tcatgcatg 2400
tgaccgatcg cgaggcgctc gccgaagtgc tgaaagccct tccggtgaa aaccgttga 2460
ccgcggtagt gcatgcggca ggcgtgatcg agactggtga tgcggcgga atgagcctg 2520
ctgatttcga tcacgtgttg tccgcaaagg tggccgggtg cgcgaatctg gatgccttgt 2580
tggccgatgt ggaattggac gcgttcgtct tgttctcatc ggtgtcagga gtttggggcg 2640
ctgggggaca cggggcttac gcagcggcga atgcctatct ggatgcgctc gcggaacagc 2700
gtcggtcgag agggctggtc gcgactcggt tggcctgggg gccgtgggac ggcgagggca 2760
tggcctccgg agaaacagga gaccagctgc gccgatacgg ctttcccca atggctccgc 2820
agcacgcat cgccggaatc cggcaggccg tggaaacagga cgaaatttcc ctggtagtgg 2880
```

ccgatgtcga	ttgggcacgt	ttcagcgcg	gattgctggc	ggctaggccg	cggccgctgc	2940
tgaacgaact	ggccgaggtc	aaggaactcc	tcgctgatgc	ccagcccag	gcgggagtc	3000
ttgccgacgc	gtcgttggaa	tggcggcagc	gattgtccgc	ggcaccgagg	ccgacacagg	3060
aacagctgat	cctggagctg	gtacgcggcg	aaaccgctct	ggtgctggga	caccccgggg	3120
cagcggccgt	tgcacggaa	cgagccttca	aggacagcgg	attcgactcg	caggcccgcg	3180
tcgaactccg	cgttcggctc	aatcgagcta	ccggcctcca	gttgccatcg	acaattatct	3240
tcagccatcc	cacgcctgcg	gaactggctg	cggagctgcg	ggcgaggctt	cttcccagat	3300
ccgcaggagc	aggcattccc	gaggaggacg	aggcgcgaa	cagagcggca	ctgacgtcga	3360
tcccgttccc	ggccttgccg	gaggcaggct	tggtagtcc	gctgctcgca	cttgccggac	3420
acccggtcga	ctccggtatc	tcctcggacg	atgcggccgc	gacctcgatc	gatgcgatgg	3480
atgtagccgg	cctcgctcga	gcagcgctgg	gcgaacgcga	gtcctgagac	cgccgacctg	3540
ggagatgacg	gtgaccacca	gttacgaaga	agttgtcgag	gcactgcgag	catcgctcaa	3600
ggagaacgaa	cgcctccggc	gcggcagggg	tcggttctcc	gcggagaagg	acgatcccat	3660
cgcgatcgtg	gcgatgagtt	gtcgttatcc	cggtcaggtc	tcctcgccgg	aggacctgtg	3720
gcaactggct	gccggcggtg	tggacgcgat	ctccgaagtt	ccgggggac	gcggatggga	3780
cctggatggc	gtgttcgttc	cggactccga	tcgtcctggc	acgtcgatg	cctgcgcggg	3840
cggttttctt	cagggcggtg	cggagtccga	cgcgggtttc	ttcgggattt	cgcgcgctga	3900
ggcgctggcg	atggatccgc	agcagcgggt	gctgctggaa	gtcgcgtggg	aggtcttcga	3960
gcgggctggg	ctggagcagc	ggtcgacacg	cggttcccgc	gttggcgtgt	tcgtcggcac	4020
caatggccag	gactacgcgt	cgtgggttgcg	gacgcgcgcg	cctgcgggtg	caggtcatgt	4080
gctgacgggc	ggtgcggcag	cggttctttc	gggcgcgggt	gcgtattcgt	tcgggttcga	4140
gggtcctgcg	gtgacgggtg	atacggcggt	ttcgctcgct	ttggtggcgt	tgcacctggc	4200
ggggcaagca	ctgcggggccg	gtgagtgcga	ccttgccctt	gccgggtggc	tcacggtgat	4260
gtcgacgcgc	aaggtgttcc	tggagtcttc	ccgccaaacg	ggtctcgccg	cggatgggcg	4320
gtgcaagtgc	ttcgcgccgg	gtgcggatgg	cactggatgg	ggtgaggggt	ccggactggt	4380
gtgtctggag	cggttgtcgg	atgcccgcg	gaatgggcat	gaggtgctgg	cggttgttcg	4440
tggtagtcg	gtgaatcagg	acgggtgcgtc	gaatgggttg	accgcgccga	atggttcgtc	4500
gcagcagcgg	gtgattaccc	aggcgttggc	gagtgcgggg	ttgtcgggtg	ccgatgtgga	4560
tgtgtggag	gcgcattgga	cgggcacgcg	gcttgggtgat	ccgatcgagg	cgcaggcgct	4620
gatcgccacc	tacggccgtg	atcgatgatc	tggccggccg	ttgtgggttg	ggtcgggtcaa	4680
gtcgaacatc	ggtcatacgc	aagcggcgcc	gggtgtggct	ggtgtgatca	agatggtgat	4740
ggcgatgcgg	cacgggcagc	tgccacgcac	gttgacagtg	gaatcgccgt	cgcggagggt	4800
ggattggtcg	gcggggacgg	ttcaactcct	tacggagaac	acgccctggc	ccaggagtgg	4860
tcgtgttcgt	cgggtggggg	tgtcgtcggt	cgggatcagt	ggtactaacg	cgcacgtcat	4920
cctcgaacag	cccccgggag	tgccgagtc	gtctgcgggg	ccgggttcgg	gttctgtcgt	4980
ggatgttccg	gtggtgccgt	ggatggtgtc	gggcaaaaca	cccgaagcgc	tatccgcgca	5040
ggcaacggcg	ttgatgacct	atctggacga	gcgacctgat	gtctcctcgc	tggatgttgg	5100
gtactcgctg	gcgttgacac	ggtcggcgct	ggatgagcga	gcgggtggtg	tggggtcgga	5160
ccgtgaaacg	ttgttgtgcg	gtgtgaaagc	gctgtctgcc	ggtcatgagg	cttctggggt	5220
ggtgaccgga	tctgtggggg	ctgggggccc	catcgggttt	gtgttttccg	gtcaggggtg	5280
tcagtggctg	gggatgggcc	gggggcttta	ccgggctttt	ccgggtgttcg	ctgctgcctt	5340
tgacgaagct	tgtgccgagc	tggatgcaca	tctgggccag	gaaatcgggg	ttcgggagggt	5400
ggtgtccgg	tcggatgcgc	agttgctgga	tcggacgttg	tgggcgcagt	cgggtttgtt	5460
cgcgttgacg	gtgggcttgc	tgaagtgtgt	ggattcgtgg	gggggttcggc	cgagtgtgg	5520
gttggggcat	tcgggtggcg	agttggcgcc	ggcgttcgcg	gcgggtgtgg	tgtcgttgtc	5580
gggtgcggct	cggttggtgg	cgggtcgtgc	ccggttgatg	caggcgttgc	cgtctggcg	5640
tgggatgctg	gcgggtgcctg	ctgggtgagga	gctgttgtgg	tcgttgttgg	ccgatcagg	5700
tgatcgtgtg	gggatcgccg	cgggtcaacgc	tgcggggctg	gtggtgctct	ctgggtgatc	5760
ggatgtgctc	gatgaccttg	ccggtcggct	ggacgggcaa	gggatccggt	cgaggtgggt	5820
gcgggtgtcg	catgcgtttc	attcgatcgc	gatggatccg	atgctggcgg	agttcgccga	5880
attggcacga	accgtggatt	accggcggtg	tgaagtgcgc	atcgtgtcga	ccttgaccgg	5940
agacctcgat	gacgctggca	ggatgagcgg	gcccgaactac	tgggtgcgtc	aggtgcgaga	6000
gccggtccgc	ttcgccgacg	gtgtccaggc	gctggctcag	cacgatgtgg	ccactgttgt	6060
cgagctcggt	ccggacgggg	cgttgtcgcc	gctgatccag	gaatgtgtcg	ccgcatccga	6120
tcacgcgggg	cggctgagcg	cgggtcccgc	gatgcgcagg	aaccaggacg	aggcgagaa	6180
ggtgatgacg	gccctggcac	acgtccacgt	acgtggtggt	gcgggtggact	ggcgggtcgt	6240
cttcgcccgt	acgggagcga	aacaaatcga	gctgcccacc	tacgccttcc	aacgacagcg	6300

gtactggctg	gtgccatcgg	attccgggtga	tgtgacaggt	gccggctctgg	ccggggcgga	6360
gcatccgctg	ttgggtgctg	tgggtgccggt	cgcggtggt	gacgaggtgt	tgctgaccgg	6420
caggatttctg	gtgcggacgc	atccgtggct	ggccgaacac	cggtgctgg	gtgaagtgat	6480
cgttgcgggc	accgcgttgc	tggagatcgc	cttgacgcg	ggggaacgtc	ttggttgtga	6540
acgggtggaa	gagctcacc	tggaagcacc	gctggtcctg	ccggagcgcg	gggcatcca	6600
ggttcagctg	cgagtggcg	cgcccgagaa	ttccggacgc	aggccgatgg	cgctgtattc	6660
acgccccgaa	ggggcggcgg	agcatgactg	gacgcggcac	gccacgggcc	ggttggcgcc	6720
aggccgcggc	gaggcggtg	gagacctggc	cgactggccg	gtcctggcg	cgctgccggt	6780
cgacctcgac	gaattctatc	gggacctcgc	agagcttggg	ctggagtacg	gcccgatctt	6840
ccaagggctc	aaggcgccct	ggcggaagg	ggacgaggtg	tacgccgaag	ccgcgctgcc	6900
gggaacggaa	gattctggtt	tcggggtgca	tcgggactg	ctggacgcg	ctctgcacgc	6960
aacggctgtc	cgagacatgg	atgacgcacg	cttgccgttc	cagtgggaag	gtgtgtccct	7020
gcacgccaa	gccgcgcgg	ctttgcgggt	ccgcgtggtc	ccggtggtg	acgatgccaa	7080
gtccctgctg	gtttgtgatg	gcaccggtcg	accggtgatc	tcggtggacc	gactcgtatt	7140
gcggtcggct	gcggcccggc	ggaccggtgc	gcgccgacag	gcccataaag	ctcggttgta	7200
ccggttgagc	tggccaacgg	ttcaactgcc	gacatccgct	cagccaccgt	cctgcgtgct	7260
tctcggcacc	tcagaagtgt	ccgctgacat	acaggtgtat	ccggacctcc	ggtcgttgac	7320
ggctgcgttg	gatgccggtg	ccgaaccacc	cggcgtcgtc	atcgaccca	cgcccccg	7380
cggtggacga	acagcggtg	tcggggagac	gactcggcat	gcactcgacc	tggtacaagg	7440
ctggctttcc	gatcagcgac	tcaacgaatc	ccgattgctc	ctggtgacac	agggagcagt	7500
ggccgtggag	ccgggcgaac	ccgtgaccga	tctggcgag	gccgcgctct	ggggactgct	7560
gcggtcgacg	cagaccgaac	accctgatcg	cttcgtcctc	gtcgatgtgc	ctgagcccg	7620
gcaactcctc	cccgcgctgc	cgggggtgct	ggcctgcggc	gaacctcagc	tcgcgttgcg	7680
acgtggcggc	gctcatgcgc	ccagactggc	tggactgggc	agcgatgacg	tcctgcccg	7740
gccggacggc	accgggtggc	gattggaggc	cacgcgcccg	ggaagcctgg	atgggttggc	7800
attggtggac	gaaccgacgg	ccacggcacc	gctgggtgac	ggtgaggtca	ggattgcgat	7860
gcgcgcggcc	gggggtgaact	tcggggtgac	ctcggtatgt	atcccggtgt	7920	
ggcatcgctg	ggcagtgagg	gcgcgggggt	cgtggtggag	accggccccg	gcgtcaccgg	7980
cctggcacc	ggcgaccg	tgatgggaat	gatcccgaag	gcgttcgggc	cgctcgcggt	8040
cgccgaccat	cgcatggtga	cgaggattcc	cgctggttgg	agcttcgcgc	gggcgcgcatc	8100
ggtgccgac	gtctttctca	ccgcctacta	cgcgctggtt	gatctcgccg	ggttgagacc	8160
aggggagtcg	ttgctggttc	attcggccgc	cggtggggtg	gggatggccg	cgatccaact	8220
cgccaggcac	ctcggtgcag	aggtgtacgc	caccgctagc	gaggacaagt	ggcaagccgt	8280
ggagctgagc	cgagaacacc	tcgcttcgct	gcggacgtgc	gatttcgagc	agcagttcct	8340
cggggcaacc	ggcgacgcg	gcgtcgacgt	cgtgctcaac	tcctcgcgcg	gggagttcgc	8400
cgatgcgtct	ctgcgaatgc	tgccgcgcgg	tggccgtttc	ctggagttgg	ggaagacgga	8460
tgttcgtgac	cccgtcgagg	tcgccgatgc	gcatccgggc	gtgtcttacc	aggctttcga	8520
taccgtagag	gcaggcccg	agcgaatcgg	cgagatgctt	cacgagctgg	tggagttggt	8580
cgagggacgc	gtgctggagc	ccctgcctgt	cacggcttgg	gacgttcggc	aggcgcccga	8640
ggcgctacgg	cacctgagcc	aagcgcgga	tgtgggaaag	ctggtgctca	ccatgcctcc	8700
ggtgtgggac	gccgcaggca	cggttctggt	taccggcgga	acgggagcac	ttggcgcaga	8760
ggtcgcccg	cacctcgtga	tcgagcgcg	ggtgcgaaac	ctggtcctcg	tcagcaggcg	8820
cgggtcccgca	gccagtggcg	ctgctgagct	cgtggcgcaa	ctgacggcct	acggtgccga	8880
ggtttccttg	caggcttgcg	atgtcgccga	tcgtgagacc	ttggcgaaag	tgcttgccag	8940
catcccgga	gagcatccgt	tgaccgccgt	ggtgcacgcg	gctggtgttc	tcgacgacgg	9000
agtgtccgaa	tcgctcaccg	tggagcggt	ggaccaggtt	ctgcgcccga	aggtcgatgg	9060
cgcgcggaat	ctgctcgagc	tgatcgaccc	ggacgtggcc	ctcgtgttgt	tctcgtcggt	9120
gtcgggtgtg	ctcggcagcg	gtgggcaggg	taactacgcg	gcggccaact	ccttcctcga	9180
cgcattggcg	cagcaaaggc	agtgcgcgg	cctaccgacg	agatcattgg	cctggggggc	9240
ctgggcggaa	catggcatgg	ccagcacctt	gcgcgaagcc	gagcaggatc	gattggcgcg	9300
atctgggttg	ctgccgatct	cgaccgagga	ggggttgtcc	cagttcgacg	ccgcgtgcgg	9360
cggcgcgcat	accgtggtgg	cgccggttcg	attcagccgc	ttgtccgacg	ggaacgcgat	9420
caagttctcc	gtcctgcaag	gtttggtcgg	gccgcacgc	gtcaacaaag	cggcgactgc	9480
ggatgatgcc	gagagcctcc	ggaaacgggt	gggacgcttg	ccggatgcag	aacaacatcg	9540
gattctgctg	gacctcgtcc	gcatgcatgt	ggcggcagtg	ctcggttcg	ccggttctca	9600
ggagatcacc	gcggacggca	cgttcaagg	gctgggcttc	gactcgttga	ccgtggtcga	9660
gttgcgcaac	cggatcaacg	gggcgacggg	gctgcgactg	cccgcaccc	tggtgttcaa	9720

ctacccgacg	cgggatgcgc	tcgccgcgcga	cctcgtcacc	gcgctgtccg	cagaccgcct	9780
ggccgggaca	ttcgaggaac	tcgacaggtg	ggcggcgaac	ctgcccacgc	tggccagggg	9840
tgaggccacg	cgggcgcaga	tcaccacccg	gctacaggcg	atcttgacga	gcctggcgga	9900
cgtgtccggc	ggaaccggcg	gcggctccgt	gccggaccgg	ctcagatcgg	ccacggacga	9960
cgagcttttc	caactcctcg	acaacgatct	cgaacttccc	tgatgcctca	gccggagcct	10020
tcgcaacttc	ctggagggaa	acgccacatg	tcgaatgaag	agaagctccg	ggagtacttg	10080
cggcgtgcgc	tcgtggatct	gcaccaggcg	cgcgagcggc	tgcacgaggc	ggagtccggg	10140
gagcgggaac	ccatcgcgat	cgtggcgatg	ggctgccggg	acccgggtgg	ggtgcaggac	10200
ccggaagggc	tgtggaact	ggtcgctcc	ggtggcgacg	ccatcgggta	attccccgct	10260
gatcgtgggt	ggcacctcga	cgagctctac	gaccccgacc	cggatcagcc	cggaaacctgc	10320
tacacccggc	acggcggtt	cctccacgac	cgcggcgagt	tcgacgcggg	attcttcgac	10380
atcagccccc	gtgaggcgct	cgcgatggac	ccgcagcagc	ggctgctgct	ggaaatctcc	10440
tgggagaccg	tcgaatccgc	tgggatggac	ccgaggtcct	tgcgggggag	ccgcaccggg	10500
gtgttcgcgg	gattgatgta	cgagggtat	gacaccggcg	cccaccgggc	aggagaaggt	10560
gtcgaaggct	atctcggaac	cggcaatgcg	ggaagcgtcg	cctctggtcg	ggttgcgat	10620
gcgttcgggt	tcgagggccc	agcggtgacg	gtagacacgg	cgtgctcgtc	gtcgttggtg	10680
gcgctgcatt	tggcgtgtca	gtcgttgccg	cagggcgagt	gtgatctggc	gctggccggg	10740
ggagtgcagg	tgatgtcgac	gccggagagg	tctgtggagt	tctcccgta	gcgtggtctc	10800
gcaccggatg	ggcgggtgta	gtcgttcgcg	gcccgtgcgg	atggaaccgg	ttgggggtgag	10860
ggtgccgggt	tgggtgtgct	ggagcggctg	tcagacgcca	ggcggaaaccg	gcacccgggt	10920
ctggcggttg	tctgtggtag	cgcggtgaat	caggacgggtg	cgtcgaacgg	attgacggcc	10980
ccgaacgggc	tggcccagga	gcgggtcatt	cagcaggtgc	tcacgagtgc	ggggctgtcg	11040
gcgtccgatg	tggacgctgt	ggaggcgcat	ggaacgggta	cgcggcttgg	tgatccgatc	11100
gaggcgcagg	ctctgatagc	cgcctatgga	caggatcggg	accgggaccg	gccgctgtgg	11160
ttggggtcgg	tcaagtccaa	catcggtcat	acgcaggcgg	ctgcgggcgt	cgtggtgtg	11220
atcaagatgg	tcattggcgat	gcggcacggg	gagctgcgcg	gcacgttgca	cgtggacgag	11280
ccgaattcgc	acgtggactg	gtcggctggt	gcggtccgac	tcctgaccga	gaacatccgc	11340
tggccaggga	cgggtacgcg	ccgcgctgga	gtctcgtcgt	tcggggtaag	cggtaaccaac	11400
gcacacgtca	tcctcgaaca	cgaccgcgtc	gccgtgaccg	agaacgagga	agcagcgcag	11460
tccccagcac	ctgggatcgt	gccctgggcg	ttgtccgggc	ggtcgtcgac	ggcgtgcgg	11520
gcccaggccg	aacggctgcg	cgagctgtgc	gagcagaccg	atcccgacc	cgtcgatgtc	11580
ggtttctcac	tggccgccac	gcgcacggct	tgggagcacc	gagcgggtgt	gcttggtcgg	11640
gacagcgcta	cgttgcgctc	cgggcttggc	gttgttgcca	gcggtgaacc	agcggctgat	11700
gtcgttgagg	ggagcgtcct	ggacggcgag	gtcgtcttcg	tcttccccgg	tcagggtcgg	11760
cagtgggccc	gtatggcagt	cgacctgctg	gacgcttcgc	cgacgttcgc	gcgccacatg	11820
gacgagtgcg	ccaccgcgct	gcggaggtac	gtggactggg	cgttggtcga	cgtgctgcgc	11880
ggagcggaga	actccccacc	gctggaccgg	gtggacgtgc	tccagcccgc	gtccttcgcg	11940
gtgatggtgt	cgctcgccga	ggtgtggcgt	tcctacgggg	tgaggccggc	ggcgtcgtc	12000
ggccacagtc	aaggcgaat	cgcgcgggcc	tgcgcagccg	gggtgctgcc	gctggaggat	12060
gcggccaggc	ttgtcgcat	gcgcagcaga	gcgttgaagg	gactttcggg	gcgggggtgg	12120
atggcgtcgc	tggcctgccc	tgcggatgag	gtcgcggcat	tggttcgggg	atcgggcggc	12180
cgtctggaag	ttgcggcgat	caacggcccc	cgatcggctg	tggtgtccgg	cgatctgga	12240
gcgggtggac	aactgctggc	agagtgcgct	gaaaaggaca	tgctgcacg	ccgtatcccc	12300
gtcgactacg	cctcgcatte	agcgcacgtg	gaggtggttc	ggagcccggg	gctggcgccc	12360
gccgccgggg	tgcgacaccg	ggacggccag	gtgccgtggg	ggtcgacggg	gatcggcgac	12420
tgggtggatc	cggccaggct	ggacggcgag	tattggtatc	ggaacctccg	gcagccggtc	12480
cggttcgaac	acgccgtgca	gggcctggtc	gagcggggat	tcggcctggt	catcgaaatg	12540
agtgcgcata	cgggtgctgac	cacggcggtc	gaggaaaccg	gtgcggagtc	ggagaccgcc	12600
gtggccgcgg	taggtacctt	gcgacgtgac	tcgggcggcc	tccggagggt	gttgcatctg	12660
ctggccgagg	cgtacgtgcg	cggcgccacc	gtggactggg	ccgtggcgtt	cgggggcgcg	12720
ggccgacggc	tggacctgcc	gacctaccgc	ttccagcgcc	agcggtagtc	gctggacaag	12780
ggagctgcct	ccgacgaggc	tcgtgcggtc	tcggaccggg	cggcgggctg	gttctggcaa	12840
gccgtggcgc	gccaagacct	gaaaagcgtg	tccgatgccc	tcgatctcga	cgccgacgca	12900
ccgctgagcg	caacacttcc	agccctgtcc	gtctggcacc	gtcaggaacg	agaaaggggtc	12960
ttggcagacg	gttggcggtg	ccgagtcgac	tgggtacggg	tggccccgca	gccggtccgg	13020
agaacgcggg	aaacctggct	cctggtcggt	cccccgggcg	gcacgagga	agcgtggtc	13080
gaacggctga	cggatgcgtt	gaacacgcga	gggatcagca	ccctgcgcct	cgacgtgcca	13140

ccggcggcga	ccagtggcga	actcgcaacc	gaactccgcg	ccgcagccga	cggtgacccg	13200
gtgaaggcaa	tcctgtcgct	caccgcgttg	gacgagcgac	cccaccccg	atgcaaggac	13260
gtcccagagc	ggattgcctt	gctgctgaac	ctgggtcaagg	cgctcgggtga	agccgacctc	13320
agaattcctc	tgtggaccat	cacgcgtggt	gcggtcaagg	caggccccgc	agatcggtcg	13380
ctgcgcccga	tgcaggcgca	agcatggggt	ctggggcgag	tagccgcact	cgaacacccc	13440
gagcgctggg	gtgggctgat	cgacctgccg	gattcgctgg	acggcgacgt	cctcacgagg	13500
ctgggcgaag	cgctcaccaa	cggcttggcg	gaagaccaac	tggcgattcg	ccagtcgggc	13560
gtgctggccc	ggcgactggt	acccgccccg	gcgaatcagc	ccgctggacg	taagtggcgc	13620
ccccgaggga	gcgcgctgat	cacgggcgga	ctcggcgcgg	tgggcgcaca	ggtggcgagg	13680
tggttggccg	aaatcggagc	cgagcgaatc	gtgctcacca	gtcgacgggg	caaccaagca	13740
gcaggcgccg	ccgagctgga	agccgaactc	cgggcccttg	gagcgcaagt	gtccatcggt	13800
gcttgcgacg	tgaccgatcg	tgccgagatg	tccgcactac	tggccgagtt	cgacgtcacc	13860
gcggtgttcc	acgcggccgg	agtcggtcgg	ctgctgccgt	tggcggagac	cgaccagaac	13920
ggcctggccg	aaatatgctc	ggcgaaggct	cgcggcgctc	aggtgctgga	cgaactgtgc	13980
gacagcaccg	atctcgatgc	cttcgtcctg	ttctcctcgg	gtgccggggg	atggggcggg	14040
ggcggtcagg	gcgcttacgg	cgcggcgaac	gcattcttgg	acacactcgc	cgaacaacgc	14100
cgagcacgcg	gtctgccggc	aacctcgatc	tcctggggca	gttgggcccg	cggcggcatg	14160
gccgacggcg	cggcgggcga	acacctgcgg	cgacgcggga	tacgtccgat	gccggcgggc	14220
tcggccatcc	tggctctgca	ggaagtactt	gaccaggatg	agacgtgcgt	gtcgatcgct	14280
gatgtggact	gggaccgatt	cgttcccacg	ttcgccgcga	ctcgcgccac	ccggttggtt	14340
gacgaagtgc	cggcggcgag	aaaggcgatg	cccgcgaatg	ggccggcaga	accaggcggc	14400
tcgccgttcg	cccgcaatct	cgcgagagct	ccggaagccc	aacgacgcc	cgaactggtg	14460
gatctggtgt	gcgcccaggt	ggcaaccgtg	ctcgggcacg	gcagtcgcga	ggaagtccag	14520
cccgagcggg	cgttcgcgcg	gctcgggttc	gactccctca	tggcgggtga	tctgcgcaat	14580
cgtttcgcca	ccgccaccgg	gttgcgctcg	ccgaccacaa	ccgtcttcga	ctaccggaat	14640
ccggccgcct	cctgcctcag	gaactggtgg	gtgatgtcgc	gtcggtgcgc	gtcggtgcgc	14700
gtgaccgctg	ccagcgcgcc	cgcgagtga	gaaccgatcg	cgatcgtcgc	gatgagctgc	14760
cggtttccgg	gtggcgcgca	ctcgccggaa	gacctgtggc	ggctggtcgc	cgccggcacg	14820
gaggtgatcg	gcgagttccc	ctccgaccgg	ggctgggatg	cggaaggcct	ttacgatccg	14880
gatgcttcca	ggcctggaac	gacgtatgcg	cggatggcgg	gattcctcta	cgacgccggg	14940
gagttcgatg	ccgacctgtt	cggcatcagc	ccacgtgagg	cgttggcgat	ggatccgcag	15000
cagcggttgg	tgctcgaaat	cgcttgggaa	gccctcgaa	gggccggaat	cgatccgttg	15060
tccttgaagg	gcagtggggt	cggcacgtac	atcggcgctg	gaagccgtgg	gtacgcgacg	15120
gatgtgcggc	agtttcccga	ggaggcggag	ggctacctgc	tgacgggtac	ctcggccagt	15180
gtgctgtcgg	gtcgggtcgc	gtattcgttt	ggtttcgagg	gtcctgcggg	gacgggtggat	15240
acggcttggt	cgtcgtcggt	ggtggcggtt	catctggcgt	gccagtcggt	gcgttcgggc	15300
gagtgatgat	tggcggttgg	cgggtggtgt	accgtgatgt	cgacgccgga	gatgttcgtg	15360
gagttctccc	gtcagcgcgg	tttggcgccg	gatgggcggg	gcaagtgcgt	cgcgagagac	15420
gcggacggca	ccggctgggg	cgaaggcgcg	ggcctgttgt	tgctggagcg	gttgtcggac	15480
gcccaccgga	atgggcatcg	ggtgttggcg	gtgggtcgtg	ggtcagcggt	gaatcaggac	15540
ggcgccctga	acggactggc	ggcgccgaac	ggtcgcgcgc	agcagcggtg	gatcaaccag	15600
gcactcgcg	atgcggctct	ttcgcgctcc	gatgtggatg	cgggtggaggc	acatggcacc	15660
gggaccaggc	tgggtgatcc	gatcgaggcg	caggcattga	tcgcaacgta	tgggcaggcc	15720
cgggagcggg	atcggccctt	gtggctgggg	tcgggtcaagt	cgaacatcgg	tcatacgcat	15780
gccgcggcgg	gtggtgccgg	tgtgatcaag	atggtgatgg	ccatgcggca	cgggcagctg	15840
ccgcctcgcg	tgcacgcgga	tgagcccacg	tcggaggtcg	attggtcgct	gggggcgggt	15900
cggctcctcg	ccgaacaggt	accttggccg	gagtcgtgac	gtgttcgtcg	ggtggggggt	15960
tcgtcggttc	ggatcagcgg	caccaacgca	catgtgatcc	tcgaacaagc	tacgaatcg	16020
ccagatagta	cagcggagac	ggacaaaaca	gaatccggat	ctactgtcga	tattccgggt	16080
gttccctggt	tgggtgcggg	aaagacgacg	gattccctgc	ggggacaagc	cgaacgagtc	16140
ttgtctcagg	tcgagtcctg	gccggagcag	cgttcgctgg	atgttgctta	ctcgcttgct	16200
tctggccgag	ccgcgctgga	tgaacgcgct	gtcgtgctgg	gtgcggaccg	cgggtgagctg	16260
gttgctggac	tggcggcggt	ggccgcgggt	caggaggctt	ctgggggtgat	cagcggaact	16320
cgtgcttctg	ctcggttcgg	gttcgtgttc	tcggggcgag	gtggtcagtg	gttgggggatg	16380
ggcagagcgc	tctactcgaa	gtttccgggt	ttcgctgctg	cgtttgatga	ggcttgccgc	16440
gagttggagg	cacatctggg	ggaagaccgc	cgggttcggg	atgtggtcct	cgggttcgat	16500
gcgcagctgc	tggatcagac	gctgtgggcg	cagtcgggtc	tggtcgcgct	gcaagccggc	16560

ctcttggggc	tgetgggttc	gtggggcggt	cggccggatg	tggatgatggg	gcattcggtc	16620
ggggagattg	ccgccgcgtt	tgcggctggc	gtgttgctgt	tgcgggatgc	ggctcggttg	16680
gtggccgcgc	gcgcccggtt	gatgcaagcc	ctgccctctg	acggcgcgat	ggtggcggtg	16740
gctgctggtg	aagaccttgt	tcgccatttg	ctggccggtc	gggaggagtc	cgtgagcgtc	16800
gccgcgctca	atgcccccg	ttcggtggtg	ttgtcggggc	atcgggaggt	gctggccagc	16860
atcgtcggcc	ggctgaccga	gctccgagtc	cggacgcggc	gcttgcggtt	ctcccatgct	16920
tttcattcgc	accggatgga	cccgatgttg	ggcgagtctg	cccagatcgc	cgagtctgcg	16980
gagttcggta	agccaacgac	accgcttgtg	tgcacgttga	cgggtgagct	cgacagagcc	17040
gcggaaatga	gcacaccagg	gtattgggtg	cgccaggcgc	gtgaaccctg	ccgtttcgcc	17100
gacggtgtcc	aggccctggc	agcgcagggc	ataggcacgg	tcgtcgagct	cggcccgagc	17160
ggaacgctgg	cggcactggt	tcgggagtgt	gcgaccgagt	ccgatcgggt	tgggcggatt	17220
tcgtcgatcc	cactgatgcg	cagggagcgg	gcagagaccc	gttcggtgat	gacagccctg	17280
gcgcattctc	acaccctggg	tggatgaggt	gactggcagg	cgtttttcgc	cggataccggc	17340
gctaggcagc	tcgagttgcc	aacgtatgcc	ttccaacgac	agcactactg	gatcgagtcc	17400
agtgcgcggc	cagcacgcga	ccgcgcagac	atcggcgagg	tggcggaaca	gttctggacc	17460
gcggttgacc	aaggcgatct	ggcaacgttg	gtcgcgcgtc	tggatcttgg	ggcggacgac	17520
gacacatgcg	catcgttgag	cgatgtattg	ccggcggtgt	cctcctggcg	aagcggactc	17580
cgcaaccgtt	cgctcgtcga	ttcctgccgg	taccgaatca	gttggcattc	ctctcgggag	17640
gtgccggccc	cgaagatttc	cggatccctg	ctgttggtcg	tgcccgggtg	tgcggatgac	17700
ggattggtca	cggctttgac	gagttcactg	gtcggaggcg	gcgccgaggt	cgtccggatc	17760
ggcctgtccg	aagaggaccc	gcaccgcgag	gacgtcgcac	agcggctggc	caatgcgctg	17820
acggatgccg	gtcaactcgg	tggcgtgctt	tcgctgttgg	ggctcgatga	atcgctgct	17880
ccgggattct	cctgcttgcc	aactggtttc	gcgctgactg	tgcagcttct	gcgggccttg	17940
cggaaaggcc	acgtcgaggc	gccttttttg	gcggtgacgc	gcggcggcgt	cgcgttgga	18000
gatgtacgcg	tgtctccgga	gcaggccctg	gtctgggggc	tgctgcgtgt	cgcgggactg	18060
gagcaccctg	agttctgggg	tggcttgatc	gacctgccat	cggactggga	cgaccgattg	18120
ggtgcccggt	tggcgggtgt	gttggcggat	ggtggcgagg	atcaagtccg	cattcgccgt	18180
ggtggtgtgt	tcgtgcggcg	gttggaaacg	gttgggtcgt	cgggtgccgg	gtcgggtgtg	18240
cgctcctcgg	ggacggtgtt	ggtgacgggt	ggtacggggc	gtttgggggc	gcatgttgcc	18300
cgggtggttg	cgggtgccgg	ggctgagcac	gtggtgttga	ccagccgtcg	aggagcggac	18360
gctccggggc	ctggggaatt	gcgggcggag	ctggaggcgc	tgggtgctcg	ggtgtcgatt	18420
gtgccctgcg	acgtggctga	tcgtgacgca	gtggctggag	tgttggcagg	gatcggtggg	18480
gagtgctccg	tgactgcggt	ggtacacgcc	gccggggctg	gcgaggcggg	cgacgtagtg	18540
gagatgggtt	tggcggattt	tgcagcgggt	ttgtcggcga	aggtgcgtgg	tgcggcgaat	18600
ctggacgagt	tgctggccga	ctcggagctg	gatgcgtttg	tgatgttctc	ctcgggtgtc	18660
gggggtgtgg	gagccggcgg	acaggggtgc	tatgcggctg	cgaacgccta	cttggatgcg	18720
ttggccgagc	agcgtcgggc	gaggggattg	gtcgggaccg	cggttgcgtg	gggaccgtgg	18780
gccggtgacg	gcattggccg	cggcgaaacc	ggcgcacagc	tgcaccggat	gggcctggcg	18840
tcgatggaac	cgagcgcggc	gctgctggca	cttcagggtg	cattggaccg	cgatgagacc	18900
tcctcgtcgt	tggccgatgt	cgattgggca	cggttcgccc	cagccttcac	ctcggcacgt	18960
cgacgcccgc	tgctggacac	catcgacgag	gcccagagcc	cattggaaac	caccggcgaa	19020
caagcgggca	caggcaaacc	cgttgagctg	acgcaacgcc	tggccggact	gtcgcggaa	19080
gaacgcgacg	atgcggtatt	ggatctggtg	cgggcggaga	cggcggctgt	gctgggacgc	19140
gacgatgccca	cggccctggc	gccatcgcg	ccgttccagg	aactcggatt	cgactccttg	19200
atggcggtgg	agctgcgcaa	ccggctgaac	accgccaccg	ggatccagct	gcccgccagc	19260
acgattttcg	actaccccaa	tgccgagtcg	ctgtcgcgtc	acctctgcgc	cgagcttttc	19320
ccaacggaga	ctaccgtgga	ctcggccctt	gccgagctcg	atcgaatcga	gcagcagctc	19380
tcgatgctca	ccggcgaaag	gcgggcacgg	gaccgaatcg	cgacacgact	gcgagccctc	19440
cacgagaagt	ggaacagcgc	agctgaagta	ccgaccggag	ccgatgtcct	gagcacgctc	19500
gattcggcga	cgcacgacga	gatattcgag	ttcatcgaca	acgagctcga	cctgtcctga	19560
gcagttcctg	cggaacttca	agcgcgaaa	tcgggtggaa	atcacaatgg	ccaatgaaga	19620
aaagctcttc	ggctatctga	agaaggtaac	tgcggacctg	catcagaccc	ggcagcgcct	19680
gctcgcggcc	gagagccgga	gtcaggagcc	gatcgcgac	gtctcggcga	gctgccgact	19740
gcccggcggc	gtcgactctc	ccgaagcgct	ctggcaactc	gtgcgcactg	gcaccgacgc	19800
catctcggag	ttccccgcgg	accggggctg	ggatctcggc	cggttgtacg	atccccgacc	19860
gaaccaccag	ggaacgtcgt	acacgcgggc	cggcggtttc	ctcgcaggag	cgggcgattt	19920
cgaccccgcc	atgttcggga	tttcgcgcgc	tgaggcggtg	gcgatggacc	cgcagcaacg	19980

gttgttgctg	gagctgtcct	gggagggccct	cgaacggggcg	ggcatagacc	cgacatccct	20040
gcgcggcagc	aagaccggtg	tcttcggtgg	tgtcacgccc	caggagtacg	ggccgtccct	20100
gcaggagatg	agccgaaacg	ctgggggttt	tggactcacc	gggcggatgg	tgagtgtggc	20160
gtcgggtcgg	gttgcgatatt	cgtttggttt	tgagggtcct	gcgggtgacgg	tggatacggc	20220
gtgttcgtcg	tcgttggtgg	ccctgcattt	ggcgtgtcag	tcgttgcggt	ccggcgaaatg	20280
cgatctcgcg	ctggccggcg	gtgtgacggt	gatggcgaca	ccggcgacgt	tcgtggagtt	20340
ctcccgctcag	cgtgggtttg	ctccggacgg	gcgggtgcaag	tcgttcgcgg	ctgccgcgga	20400
tggcaccggg	tgggggtgagg	gtgccggtct	ggtgttgctg	gagcggttgt	cggatgcgcg	20460
gcggaatggg	cacgaggttc	tggcgggtgt	gcggggtagc	gcgggtgaacc	aggacggcgc	20520
gtcgaatggt	ttgactgcgc	cgaatggctc	gtcgacgag	cgggtgatca	cccaggcggt	20580
ggcgagtgcg	gggctgtcgg	tttccgatgt	ggatgcggtc	gaggcacatg	ggaccgggac	20640
cacgttgggt	gatccgatcg	aggcacaggc	cctgatcgcc	acgtacgggc	agggccggga	20700
gaaggatcgg	ccgttggtgt	tggggtcggt	caagtccaac	atcggtcaca	cgcaggcggc	20760
cgttggtgtt	gccggcgctc	tcaagatggt	cttggtgatg	cggcacgggc	agctgcccgc	20820
cacgttgcat	gtggatgagc	ccacgtcggc	ggtggactgg	tcggcgggtt	cggtcgggct	20880
tctcacggag	aacacgccct	ggccggacag	tggtcgtcct	tgccgggtgg	gggtgtcgtc	20940
gttcgggatc	agcggcacca	acgcacatgt	gattctcgaa	cagtctccag	tcgagcaggg	21000
cgaaccggcc	gggcccggctg	aaggcgagcg	ggaaccggat	gtagccgtcc	ccgtggtgcc	21060
ttgggtgctg	tcgggtaaga	caccggaggc	tgcgcggggc	caggccgaac	gggtgcattc	21120
gcatatcgag	gaccggcccg	ggctgtcgcc	ggtggatgtg	gcgtattcgc	taggaatgac	21180
acgcgcggcg	ctggatgaac	gcgcagtgg	gttgggtcgc	gaccgtgccg	cgctccctgac	21240
cgggttgagg	gcattcgccg	acggctgcga	tgcgcccgaa	gtggtttcgg	ggtctgtggg	21300
gcttggtggc	cgcgctcgggt	tcgtgttctc	gggtcaggg	ggtcagtggc	cggggatggg	21360
ccgggggctc	tactcgggtg	ttccgggtgt	cgccgacgcg	ttcgacgagg	cttgccgcgga	21420
gttggtatgca	cacctgggccc	aggaaactgcg	ggttcgggat	gtggtgttcg	gttcgcaagc	21480
gtggttgctg	gatcggacgg	tgtgggcgca	gtcgggtttg	ttcgcgttgc	agattggctt	21540
gctgcggctg	ctgggttcgt	gggggtgttcg	gccgatgtg	gtggtggggc	actcgggtgg	21600
tgagctggct	gcgggtgcag	cggctgggtg	gttgctcgtt	tcggaggccg	cgcggttggg	21660
ggcgggtcgc	gcccgggtga	tgcaggcggt	gccttctggt	ggtgccatgc	tcgcggtcgc	21720
tacgggtgag	tttcaggctg	atcctctgct	ggatgggggtg	cgggaccgga	tcggtatcgc	21780
ggcgggtgaat	ggcccgggaat	cgggtgtgct	ctctggtgac	cgcgagctgc	tcaccgagat	21840
cgtgatcgg	ttgcacgatc	aggggtgccg	gacccggtgg	ttgcgggtgt	cgcagtcttt	21900
ccattcgccc	catatggagc	cgatgctgga	ggagttcgcc	cagatctccc	gaggccgcga	21960
atatcacgca	ccggaactgc	cgatcatctc	gaccctgatc	ggtgagctgg	acggtggtcg	22020
agtgatgggc	actcccagat	actgggtgcg	tcaggtgctg	gagcccgtcc	gtttcgccga	22080
gggtgtccag	gcgcttgctg	gtcagggtgt	cggcacgatt	gtcgaattgg	gtccggacgg	22140
ggcgttgctg	acgttggtcg	aggagtgtgt	ggcggaaatcc	gggcgggtgg	ccgggatccc	22200
gctgatgcgc	aaggaccgcg	acgaggcgcg	aaccgtgctg	gcagcttttg	cgcagatcca	22260
caccctgggt	ggtgaggtgg	actggcggct	gtttttcgcc	ggtaccgggg	cgaagcaagt	22320
cgacctgccc	acctacgctt	tccagcggca	gcggtaactg	ctggcatcca	ccgggcgtgc	22380
gggtgacgtg	accgcgcgcg	gattggccga	ggcggaccat	ccgtgctcgc	gtgcgggtgg	22440
tgcgttggca	gacggcgaag	gtgtggtgct	gaccggctcg	ttgacagcgg	gttcgcaccc	22500
gtggttgctc	gatcaccggg	tgtgggcgca	aatcgtcgtc	cccggcaccg	cgatcgtcga	22560
gctggtgtgg	cacgtcggcg	agcgccctcg	ttgtggcccg	gtggaagaac	tggctttgga	22620
agcggccctg	atcctgcccg	atcatggagc	ggtccagggt	cagggtgctgg	tgggaccgcc	22680
cggggaatcc	ggagcccgg	cgggtggcgt	ctactcctgt	cctggcgagg	cgatcgaacc	22740
cgagtggaag	aagcacgcga	cgggcgtgct	tctcccaccc	gtggccgcgc	agaaccatga	22800
gctgaccgca	tggcccccg	agaatgcgac	cgaatcgat	gcagacgggg	tctacgcatt	22860
ccttgaagg	cacggtttcg	cgtacggacc	ggcctttaga	tgtctgcgcg	gtgcctggcg	22920
acgaggcggg	gaggtgttcg	ccgaagtgc	attgccggat	gacatgcagg	cgggggtcga	22980
tcgattcggc	gtccaccccg	cgttgctgga	cgcggttctg	catgccgcgc	cagccgagac	23040
gtcggtggtc	cagagcgaag	cgcgggtgcc	gttctcgtgg	cgtgggggtg	aacttcgcgc	23100
cactgaaagc	gcggtggtgc	gggcgcgcct	ctcgttgact	tcggatgacg	aactgtcggt	23160
ggtcgcagtg	gacccggctg	gccgattcgt	ggccacgggt	gattcgctgg	tgacccgacc	23220
gatctcccgg	cagcaggtga	ggtctggcgc	gatcggtgat	tgcctgttcg	aggtggagtg	23280
gcaccggaag	gcgttggttg	gaacaaccgc	cggcgacgac	cttgccatcg	tcggtgacgg	23340
tcccagttgg	ccggaatcgg	tgcgcgcaac	cgcacggttc	gcgaccctgg	atgagttccg	23400

tgccggccgtg	gactcggacg	ttcctgcccc	gggttcgggtg	ttggtcgcag	ctatgtcggc	23460
cgaagaggtc	gaggggtgat	ccctgccgtc	gcgcgcccaa	gagtcgacct	ccgatctgct	23520
ggctctcgtg	cagtcgtggc	ttgcggacga	gcggttcgcc	gaatcccagc	tcgtgggtcgt	23580
cacgcgtgca	gcggtgtcgg	ccgactcgga	ttcggacgtc	gcggacctgg	tgggtgcgtc	23640
gtcgtggggg	ttgttgagtt	cagcccagtc	ggagaaccgc	ggtcgcttcg	tgctgggtgga	23700
cgtggacggc	acacctgagt	cgtggcaggc	ggtgcgggcc	gccgtgcgag	caggagaacc	23760
gcagctggca	cttcggcgcg	gcgtggcgct	ggtgcctcgg	ttggcgcgac	tcacggtgcg	23820
cgaggagggc	tcctccccgc	aactcgacac	ggacgggacc	gtcctcatca	cgggtggcac	23880
cgggtgcgttg	gggggagtg	ttgcccgtca	cctggtggag	gagcacggga	ttcggcgttt	23940
ggtgttgga	ggccggcggtg	gctggaatgc	gcctggagtc	cacgagttgg	tggatgagct	24000
ggcgcgcgcg	ggcgccggtg	ttgaggtggt	ggcttgcgat	gtggctgacc	gcaccgatct	24060
ggagcacgtg	ctggccgcca	ttccggtcga	ctggccgctg	cgggggatcg	tgcataccgc	24120
tggggtgctg	gccgacggag	tgatcgggtc	cttgtcggcg	gcggatgtgg	gcacggtggt	24180
tgccccgaag	gtgacggggg	catggcatct	gcacgagttg	accgcgatac	tggatctgtc	24240
gttcttcgtt	cttttctctt	ccttctccgg	gattgcgggt	gccgcagggc	aggccaacta	24300
cgcggcgggc	aacacgttcc	tggatgcatt	ggcgcgttat	cgcggggcgc	gtgggctgcc	24360
tgggttgtcg	ttggcggtgg	gactgtgggc	gcaaccagc	ggtatgacga	gtggccttga	24420
cgcggcgctc	gtggagcggg	tggcgcgga	gggcatcgca	gaactttcca	cggaggatgg	24480
actccgcctg	ttcgatgccg	cgttcgcgaa	ggaccgggct	tgcgtcgttg	ccgctcgatt	24540
ggacagggcg	ctgctggctg	ggaacggacg	atcgcacgcg	attccggcgc	tggtgagcgc	24600
gttggttcct	gttcgcggcg	gtgtggcgag	gaaaacagcc	aattctcagg	ccgcggatga	24660
ggacgcactg	ttgggttttg	tgcgggagca	cgtttcggcc	gtgctgggtt	attcgggtgc	24720
ggtcgaggtt	gggggcgacc	gtgctttccg	tgatctgggt	tttgattcgt	tgtctggcgt	24780
ggagttgcgg	aaccgccttg	ccggggtgct	gggggtgcgg	ttgccggcga	ctgcggtggt	24840
cgactatccg	acgcgcgggg	cgtggcgcg	tttcttgcac	caggaaactg	caggcgaggt	24900
cgcgtccacg	tcgacgcggg	tgaccagggc	agcgagtgcc	gaagaggatc	ttgttgcgat	24960
tgtcgggatg	ggatgtcggt	ttccgggttg	ggtgtcgtcg	ccggaggagc	tttggcggct	25020
ggtggccggc	ggcggtcgat	cgggtggctg	gttcccagac	gatcgcggct	gggatctcgc	25080
ggcgttgtac	gatactgatc	ccgatcgtct	cgggacctcg	tatgtgtgtg	agggcgggtt	25140
tctgcgggac	gcggcgaggt	tcgatgctga	catgttcggc	atcagcccgc	gtgaggcggt	25200
ggcgatggat	ccgcagcagc	ggttgctgct	ggaggtcgcc	tgggaaacct	tggagcgggc	25260
tgggatcgat	ccgttctcgt	tgcacggcag	ccggaccggg	gtgttcgcgg	gcttgatgta	25320
ccacgactat	ggggcccgat	tcattaccag	agcacccgag	ggcttcgaag	ggcacctcgg	25380
gacgggcaat	gcggggagcg	tgtgtcggg	tcgggttcg	tattcgtttg	gtttcgaggg	25440
tcctgcgggtg	acggtggata	cggcgtgttc	gtcgtcgttg	gtggcggtac	acctggcggg	25500
tcaagcactg	cgggcccggg	agtgcgaatt	cgcccttgcc	ggtggcgcta	cgggtgatgtc	25560
gacgccgacg	acgttcgtgg	agttctccc	tcaacggggg	ctgggtccgg	atgggcccgtg	25620
caagtcgttc	gcggcgggcg	cggatggcac	cgggtggggc	gagggtgccg	gtctgggtgtt	25680
gctggagcgg	ttgtcggatg	ccggcgcaa	tgggcacgag	gttctggcgg	tgggtgcggg	25740
tagcgcggtg	aaccaggacg	gcgcgtcgaa	tggcttgact	gcgccaaatg	gtccgtcaca	25800
gcaaaggggtg	atcaccaggg	cactcacgag	tgccgggctg	tcctgttcgg	acgtggatgc	25860
tgtggaggcg	catgggacgg	gcacgcggct	tggatgatcc	atcgaggcgc	aggcgttgat	25920
cgtacgtac	ggccgggatc	gtgatcccgg	tcggcgggtg	tggctggggg	cggatgaagtc	25980
gaatattggt	cacacccagg	cggcgggcgg	tgtcgtgggt	gtgatcaaga	tggatgatggc	26040
gatgcggcag	ggggagctgc	cgcgcacggt	gcacgtggac	gagccctccg	cgcaggtgga	26100
ctgggtctgcg	ggcacgggtc	aactcctcac	ggagaacacg	ccctggcccc	acagcgggtcg	26160
tcttcgcggg	gcgggctgtg	catcggttcg	gatcagtggt	accaacgcgc	acctgatcct	26220
tgaacaacct	ccgcgagagt	cgcagcgctc	aacagagccg	gattcgggtt	ctgtccgcga	26280
ttttccgggtg	gtgccgtgga	tgggtgcggg	caaaacaccc	gaagcgctat	ccgccagggc	26340
agatgcattg	atgtcctact	tgagcaatcg	cgttgatgct	ccccgcgag	atatcggtta	26400
ttcgcttgcg	gtgaccgcgt	cggcgttgga	ccaccgcgct	gtcgtgctgg	gtgcggatcg	26460
tgccgcgttg	ctgccgggct	tgaagcgct	ggcggttagt	aatgacgctg	ccgaggtgat	26520
caccggcact	cgtgccgctg	ggccgggtcg	attcgtgttc	tcgggtcaag	gtggtcagtg	26580
gcccgggatg	ggaagcgggc	tccactcggc	gtttccgggtg	ttcgccgacg	cgtttgacga	26640
agcctgctgc	gagctggatg	cgcactctcg	gcagatggcc	cggctacgag	atgtgttgct	26700
cggttcggat	acgcaacttc	tggaccagac	cttgtgggctg	cagccggggc	tgttcgcggt	26760
gcaagtcgga	ctctgggagt	tgttgggttc	gtggggtgct	cggcccgcgtg	tgggtgctggg	26820

ccactcgggtc	ggtgagctgg	cggcggcggtt	cgcggtctgga	gtgttgctcgt	tgcgggatgc	26880
ggctcggctg	gtggcgggcc	gtgcccgggtt	gatgcaagcc	ctgccaaactg	gcggtgccat	26940
gctcgctgcg	gctgctggag	aggagcagct	gcgcccgttg	ctggccgact	gcggtgatcg	27000
tgtggggatc	gccgcgggtca	acgctcccgg	gtcgggtggtg	ctctccgggtg	atcgggatgt	27060
gctcgatgac	attgccgggtc	ggctggacgg	gcaagggatc	cggtccaggt	ggttgccgggt	27120
ttcgcatgcg	tttcattcgc	atcggatgga	tccgatgctg	gcggagttca	ccgaaatcgc	27180
ccggagcgtg	gactaccggg	cgtcagggct	gccgatcgtg	tcgacgttga	cgggtgagct	27240
cgatgaggtc	ggcatgccgg	ctacgccgga	gtattgggtg	cgccaggtgc	gagaacccgt	27300
ccgcttcgcc	gacgggtgtg	ctgcgctcgc	ggctcacggg	gtgagcaccg	tcgtcgaggt	27360
cggtcgggat	gggggtgttg	cggcgctggt	gcaggagtgc	gcggccggat	ccgatcaggg	27420
cggacgggtg	gccgcgggtt	cgtcatgctg	cagcaatcgc	gacgaggcgc	acacggtgac	27480
aacggcattg	gcgcagatcc	atgtgcgtgg	tgtgaggtg	gactggcggg	cgtttttcgc	27540
cggtaaccgg	gcaaagcagg	tcgagctgcc	cacgtatgcc	ttccaacgac	agcgggtactg	27600
gcttgactca	ccatccgaac	cggtcgggca	atccgcgat	cccgcgcgcc	agtcgggctt	27660
ctgggaactc	gtcgagcagg	aagatgtcag	cgcgctcagc	gccgctctgc	acattaccgg	27720
cgatcacgac	gtgcaggcgt	ccctggaatc	ggtggttccg	gtcctctcct	cctggcatcg	27780
ccggatccgc	aacgaatccc	tgggtcacca	gtggcggtac	cggatttccct	ggcatgagcg	27840
ggcagatttg	ccagaccctt	cgttgctcgg	gacatggctc	gtcgtcgtgc	cggaggggtg	27900
gtcggcgagt	cggcaagttc	tgcgtttcaa	cgagatgttc	gaggaacggg	gttgcccggc	27960
agttctgttc	gagctcgccg	ggcacgacga	ggaagccctg	gcgcaacgat	tccgctcgtt	28020
gcctgttgcg	tcagggggaa	taagcggcgt	gttgtccttg	ctggcgctgg	atgaatcgcc	28080
gtcctcgccg	aacgctgctt	tgccgaatgg	cgcgctgaac	tcgttggtac	tgtgcgagc	28140
tctgcgggcc	gcggatgtgt	cggcgccatt	gtggttggcg	acgtgtggtg	gtgtcgcggt	28200
cggggatgtg	ccggtgaacc	cggggcaggg	gctggtgtgg	ggactgggtc	gcgtcgtcgg	28260
tctggagcat	ccggctgtgt	gggggtggct	ggtcgacgtg	ccgtgcttgc	tcgatgagga	28320
cgtcagagaa	cgcctgtcgg	tcgtgttgcc	aggtcttgcc	gaggacgaga	tcgcggtacg	28380
tcccgggtgt	gtgttcgtgc	ggcggttgga	acgcgctggg	gcggcgctcg	gtgccgggtc	28440
ggtgtggcgt	cctcggggga	cgggtgtggt	gacgggtggt	acgggcgggt	tgggggcgca	28500
tgttgcccgg	tgggtggcgg	gtgccggggc	tgagcatgtg	gtgttgacca	gccgtcgagg	28560
cgcggcggct	ccgggcgctg	gagatttgctg	ggcggagctg	gaggcgctgg	gcgctcgggt	28620
ttcgatcacg	gcctgcgacg	tggccgatcg	tgacgctttg	gccgaagtgt	tggcgaccat	28680
tccggatgat	tgcgcgctga	ccgcgggtgat	gcatgcggcg	ggggtcgttg	aagtcggcga	28740
cgtggcgctg	atgtgtttga	ccgacttcgt	tggggtgctg	tcggcgaagg	caggtggtgc	28800
ggcgaatctc	gatgagttgc	tcgccgatgt	cgagctggat	gccttcgtgc	tgttctcatc	28860
cgtctcgggt	gtgtgggggtg	ctggcgggca	gggcgcttat	gcggcgggca	atgcctactt	28920
ggatgcgttg	gcgcagcagc	gtcgggcaag	gggggtggtg	gggactgcgg	ttgcgtgggg	28980
cccggtggcc	ggtgacggaa	tggccgcagg	tgaaggcggg	gcacagctgc	gccggggcgg	29040
cctggtgcc	atggctgcgg	atcgggcgtt	gctggcactt	cagggcgcgt	tggatcgtga	29100
cgagacatcc	ctggctcgtg	ccgatatggc	gtgggagagg	ttcgccccgg	tgttcgccat	29160
gtcccgtcgg	cgtccgctgc	tcgacgagct	gccgaagca	cagcaggcgt	tggcggatgc	29220
ggagaacacc	actgatgctg	cggactcggc	cgtcccgtca	ccgcggctcg	cgggcattgc	29280
agccgccgaa	cgccgcgcgg	cgatgctgga	cctggtgctg	gcggaggcct	cgattgtgtt	29340
gggacacaac	gggtctgacc	cagttggtcc	cgaccgggcg	ttccaggagc	tcggatttga	29400
ttcgctgatg	gccgtcgaac	tgcgcaacag	gttgggagag	gcaacaggat	tgagtctgcc	29460
ggccacgttg	atcttcgatt	atccgagccc	atccgcgctg	gctgagcagc	tggtcggcga	29520
gctggtggga	gcgcagcccg	cgaccaccgt	cgtggccggg	gccgatccag	tggatgatcc	29580
ggttgctcgtg	gtcgcgatgg	gatgccggta	tccgggagac	gtctgctcgc	ccgaggagct	29640
gtggcagctg	gtttctgcgg	gacgtgatgc	ggtatcgacg	ttccccgtcg	atcgggggtt	29700
ggactgcaac	acgttggttcg	acccggatcc	ggatcgggca	ggcagtaact	atgtgcgaga	29760
aggtgccttc	ctgaccgggtg	ctgatcgggt	cgacgcgggg	ttcttcggca	tcagccctcg	29820
cgaggcgcgc	gcaatggatc	cgcagcagag	gttggtgctc	gaagtggcgt	gggaggtttt	29880
cgaacgagca	ggaatcgctc	cgtgtcgtt	gcggggtagc	aggaccgggtg	tgttcgcggg	29940
gaccaatggg	caggaccacg	gtgcgaaagt	ggctgccgcg	ccggaggcgg	cgggtcacct	30000
cctgaccgga	aacgcgcgca	gtgtcctggc	cggccggctt	tcctacacgt	tcggccttga	30060
ggggcctgcg	gtggcggtgg	ataccgcgtg	ttcgtcgtcg	ttggtggcgt	tgcatttggc	30120
gtgccagtcg	ctgcgttcgg	gtgagtgtga	tatggcgttg	gcagggtggtg	tgacggtgat	30180
gtcgacaccc	ctggctttcc	tcgagttctc	tcgtcagcgc	ggtttggcgc	cagatggtcg	30240

gtgcaagtcg	tttgcgcccg	ctgcggatgg	caccgggtgg	ggtgaggggtg	cgggcctggt	30300
gttgctggag	cggttgctcg	atgctcgtcg	gaatggtcac	cgggtggttg	ccgtggttcg	30360
cgggtctgcg	gtgaatcagg	atggtgctgc	gaatggcctg	actgcgccga	atggtccgtc	30420
gcagcagcgg	gtgattcggc	aggccctcgc	gaatgcgggg	ctgtcggcgt	ccgatgtgga	30480
tgtcgtggag	gcgcacggga	ccggtaccgg	gctcggggat	ccgatcgagg	cgcaggcgtc	30540
gatcgcgaca	tatgggcagg	agcgggatcc	tgagcggggc	ctgtggctgg	ggtcgatcaa	30600
gtccaacatc	ggccacacgc	aggcggcggc	cgggtgtggcg	ggggtcacat	agatggtgca	30660
ggccatgcgg	cacggggagt	tgcttgcgac	gttgacagtg	gacaagccca	ctccacaggt	30720
ggactggtct	gccggggccg	ttcggtcctc	caccgggaac	acgccctggc	ccgagagcgg	30780
ccgtcctcgt	cgagcggggg	tgtcgtcggt	cgggatcagc	ggcaccaacg	cacacctcat	30840
cctcgaacaa	ccaccgtcgg	aaccagcgga	gatcgaccaa	tcggatcggc	gggtcactgc	30900
gcattccagc	gtgatcccg	ggatgttgct	ggctaggagt	ctcgcagcgc	tgcaggccca	30960
agcggtgctg	ctgcaggccc	ggctggaccg	gggtcctggc	gcttctccgc	tggatttggg	31020
gtattcactc	gcgaccactc	gttctgtgct	ggacgaacgc	gccgtcgtgt	ggggtgccga	31080
tcgggaggca	ctgctgtcca	ggctggcagc	gctcgccgat	ggccggacgg	cgcggggggt	31140
gataacgggc	tctgcgaatt	ccggtggccg	catcggattc	gttttttccg	gtcagggcag	31200
tcagtggctg	gggatgggaa	aggcgttggt	cgcggcttcc	ccggcgttcg	cggacgcctt	31260
cgaggaagcc	tgcgacgcgc	taagcgcaca	cctgggcgcg	gacgttcggg	gtgtgctgtt	31320
cgggtgctgat	gagcagatgc	tcgaccggac	gctgtgggcg	cagtcgggga	tcttcgcggg	31380
tcaagtcggc	ctcctgggat	tgtgaggtc	gtggggcggt	cggccggccg	cgggtgctggg	31440
gcactcggtc	ggcgagttgg	ctgcggcgca	cgcggctggt	gtgttgctct	tgccggacgc	31500
tgcacggttg	gttgcggtc	gggcccacct	gatgcaggca	ttgcccaccg	gcggcgcaat	31560
gctcgcggtc	gccaccagcg	aggcggcggt	cggaccgctg	ctttccgggg	tgtgcgatcg	31620
ggtcagcatc	gctgcgatca	acggccccga	gtcggtagtg	ctctccggcg	accgcgatgt	31680
gctcgtggag	ctcgcaggcg	aattcgatgc	ccgagggtct	aggaccaa	ggttgcgggg	31740
ctcccattgt	ttccactcgc	accggatgga	accgattctg	gacgagtacg	cggaaaccgc	31800
caggtgcgtc	gagttcggtg	aaccgggtgt	gccgatcgct	tccgcccgcg	ccggtgcgct	31860
ggaccaccac	ggactgatgt	gcgcggccga	ctactggacg	cgccaagtgc	gtgatcctgt	31920
ccgcttcgga	gacggtgtcc	gggcgctcgt	cggccaaggc	gtggacacga	tcgtcgagtt	31980
cggcccggac	ggggcgttgt	cggccctggt	cgagcagtg	ttggccgggt	ccgaccaggc	32040
tgggaggggtg	gcggcgatcc	cgtgatgctg	cagggaaccg	gatgaggtcg	agaccgcggg	32100
ggcggccctg	gcgcacgtgc	acgtccgcgg	tggtgcgggtg	gactggtcgg	cttgcttcgc	32160
cggcaccggc	gcccgcaccg	tcgagttgcc	cacctacgcc	ttccaacgcc	agcggtagctg	32220
gctggccggg	caagcggacg	ggcgcgcgcg	cgatgtggtt	gccgaccggg	tcgacgcgcg	32280
cttctgggag	ttggtcgagc	gcgccgatcc	ggaaccgttg	gtggatgaac	tctgcattcg	32340
ccgggaccag	cccttcgggg	aggtgctgcc	cgttctgggt	tcctggcgcg	agaaacaacg	32400
ccaggaggcc	ctcgcggatt	cctggcgcta	ccaggtgcgc	tggaggtccg	tcgaggtgcc	32460
gtccgcagcc	gccctccggg	gcgtgtggct	ggtggtgctt	ccagctgacg	tgccccgaga	32520
tcaaccggcg	gtcgtcatcg	acgcgctgat	cgcgcgcggc	gccgaggtcg	cggctcctgga	32580
attgaccgag	caggacctcc	aacgcagtg	gcttgtggac	aaggtgcgcg	ccgtcattgc	32640
ggaccgcacc	gaggtgacgg	gtgtgttgct	tctgttggcg	atggacggca	tgccctgcgc	32700
ggcgcatccg	cacctgtccc	gtggtgtcgc	cgtaccgtg	atcctgacgc	aggtgttggg	32760
cgatgcgggt	gtttccgccc	cgtgtgggt	ggccacgacc	ggtggcgctc	aggccgggac	32820
cgaggacggg	ccggccgatc	cggaccacgg	cttgatctgg	gggtcgggca	gggtcgtcgg	32880
ccttgaacat	ccgcagtggg	ggggtggcct	gatcgacctt	ccggagacac	tggacgagac	32940
gtcccggaac	gggttgggtg	ccgcactcgc	cgggacggcg	gccgaagatc	agctcgccgt	33000
gcgttcattc	gggttggtcg	ttcgcagagt	ggtgcgcgca	gcgcgggaacc	cccggtcaga	33060
gacatggcgt	agccggggaa	cggctctcat	cacgggcgga	acaggcgcg	tcggtgccga	33120
ggtcgcacga	tggctggccc	ggcggggagc	tgagcacctg	gtgttgatca	gtcgccgcgg	33180
cccggaaagt	cccggcgag	cggacctagg	ggccgagctg	actgaactcg	gcgtgaaagt	33240
cacagtcttg	gcctgcgatg	tgacggaccg	cgacgagctg	gcggcggtgc	tggcgggcgt	33300
tcccacggag	tatccgctgt	cggcggtcgt	gcacaccgcc	ggcgtcggga	cgcctgcgaa	33360
cctggccgag	acgaccttgg	cgcagttcgc	cgacgtgttg	tcggccaagg	tcgtcggcgc	33420
ggcgaacctg	gaccggctgc	ttggcgggca	accgttggac	gccttcgtgc	tgttctcctc	33480
gatctcggga	gtttggggag	ccggcggcca	aggagcctat	tcggccgcca	atgcgtatct	33540
cgatgccctt	gccgagcgcc	gacgggcttg	cgggcggccg	gcgacgtgca	tcgcctgggg	33600
tccgtgggcg	ggtgcgggca	tggccgttca	ggaaggtaac	gaggcgcac	tccgccgaag	33660

gggcctggta	ccgatggaac	cgcagtcggc	cctcttcgcg	ctgcaacagg	ccctgtccca	33720
acgagaaacc	gccatcaccg	tcgcagatgt	ggactgggag	cgatttcgcc	cctctttcac	33780
cgcggcccg	ccgcgaccac	tgttggaaga	gatcgtggat	ctacggcccc	acaccgagac	33840
cgaggagaag	cacggtgccg	gcgagctggg	gcagcagctg	gccgcactgc	cgccccgtga	33900
gcgcggacac	ctgctgctgg	aggtggtgct	ggcggaacc	gccagcacc	tggggcacga	33960
ttcggcggag	gctgtgcaac	ccgatcggac	cttcgccgaa	ctgggcttcg	attcgtgac	34020
cgcggtagag	ctgcgcaaca	ggttgaacgc	ggtgaccggg	cttcgcctgc	cgccgacgct	34080
ggttttcgac	cacccgacgc	cgtggcggtt	gtccgaacag	ttggttcggg	ccctggtcgc	34140
ggagccggac	aacggcatcg	aatcgctgct	cgccgagctc	gacaggctgg	ataccacgtt	34200
ggcgcaagg	ccttcgatcc	cactggaaga	ccaggccaag	gtggcggagc	gcttgacgc	34260
actcctcgcc	aagtgggacg	gggcgcgtga	cggcacggcc	agagcgacgt	cacccaatc	34320
gctgacggcg	gccacggacg	acgaaatctt	cgacctcatc	gaccggaagt	tccggcgctg	34380
accgcccttt	cctcgccctca	gtccccctga	ttactggaac	ggtgtatttc	gatggccaat	34440
gaagaaaagc	tccgcgagta	cctcaagcgt	gtcgtcgtcg	aactggaaga	ggcgcacgaa	34500
cgctgcacg	agttggagcg	ccaggagcac	gaccccatcg	cgatcgtgtc	gatgggatgt	34560
cgttatcccg	gtggcgcttc	cactccggag	gagctgtggc	gactggtcgt	cgacggagga	34620
gacgcgatcg	cgaacttccc	cgaagaccgt	ggctggaatc	tggacgagct	gttcgatcct	34680
gatccggggc	gagccgggac	ctcctacgtc	cgcgaggggtg	gtttcctgcg	cggggtcgcy	34740
gacttcgatg	ccgggctctt	cgggatcagt	ccgcgcgagg	cacaggcgat	ggacccgcaa	34800
cagcggttgc	tgctggagat	ctcgtgggag	gtgttcgagc	gcgccggcat	tgacccgttt	34860
tctttgcggg	gtaccaagac	cggtgtgttc	gcgggcctga	tctaccacga	ctacgcgtcg	34920
cggtttcgca	agacccccgc	ggagttcgag	ggttacttcg	ccaccggcaa	cgcgggcagc	34980
gtcgcacccg	gccgggtggc	ttacaccttc	gggttagagg	gcccgggcgt	caccgtggac	35040
accgcctgct	cgtcgtccct	gggtggcgctg	cacctggcct	gccagtccct	gcggctgggc	35100
gaatgcgacc	tggccctggc	cggtggcatt	tcgggtgatgg	ccacgcgggg	agccttcgtc	35160
gagttcagcc	ggcaacgcgc	actcgcctcg	gatggccggg	gcaagccctt	cgcggtatgc	35220
gccgacggca	ccggctgggg	cgagggcgcc	ggaatgctgc	tgttggaacg	gctgtcggag	35280
gcacgacgaa	acggccaccc	gggtgctggcg	gcgggtggctg	gttccgcgat	caaccaggac	35340
gggacgtcca	acggcctgac	cgcgcccgac	ggtcccgcac	agcagcgagt	gatccgcca	35400
gccctggcga	acgcggggtt	gtcgcgccgc	gaggtcgatg	tggtcgaggc	gcacggcacg	35460
ggcacggcct	tgggcgaccc	gatcgaggcg	caggccctga	tcgccacctc	cggggcgaa	35520
cggtcggcgg	atcatccgct	gctgctgggt	tccctcaagt	cgaacatcgg	ccacaccag	35580
gctgcgcgcg	gtgtggcccg	ggtgatcaag	tcggctcctg	ccatcaggca	ccgggagatg	35640
ccccgcagcc	tgcacatcga	ccagccatcg	cagcacgtgg	actggtcggc	gggcgcgggtg	35700
cggtgctca	cggacagcgt	tgactggccg	gatctcggca	ggccgcgccg	agcaggggtg	35760
tcctcgttcg	gcatgagcgg	taccaacgca	cacctgatcg	tcgaggaagt	atccgacgag	35820
ccggtctcgg	gcagtaccga	gccgaccggg	gcatttccct	ggccgctgtc	cggcaagacg	35880
gagacggcat	tgcgcgagca	ggctgccgag	ttgctctccg	tagtgaccga	gcaccggag	35940
ccgggactgg	gggacgtcgg	gtactcgctg	gccaccggtc	gcgctgcgat	ggagcaccgg	36000
gctgtcgtgg	ttgccgacga	tcgggactct	ttcgtcgccg	gactgacggc	gttggtcgcg	36060
ggcgttcggg	cagccaacgt	ggtgcagggc	gcggccgact	gcaagggaaa	ggtcgcgttc	36120
gtgttccccg	gccagggctc	gcattggcag	gggatggcga	gggaactgtc	cgaatcctcg	36180
ccggtgttcc	ggcggaagct	ggcggaatgc	gcggcggtca	cggccccctt	cgtggactgg	36240
tcgctgctcg	gcgtccttcg	cggtgatccc	gatgcacccg	cgctggatcg	cgacgacgtg	36300
attcagctcg	cgctgttcgc	catgatgggtg	tcgctggccg	aactgtggcg	ttcgtgcgga	36360
gtggagcccg	ccgcggtggt	cggtcatttc	cagggcgaga	tcgccgcgcg	ccatgtggca	36420
ggcgctttgt	ccttgactga	tgcggtgcgc	atcatcgctg	cccgtgcga	tgcggtgtcg	36480
gcgctgaccg	ggaagggagg	catgctcgcg	attgccttgc	cggaaagcgc	ggtggtgaag	36540
cgaatcgag	gcctgccgga	gctgaccggt	gcggcggtca	acggaccggg	ctccactgtc	36600
gtttccggcg	aaccgtcggc	tctggagcgt	ctgcagaccg	aactgaccgc	ggaaaacgtg	36660
cagaccgggc	gggtgggaat	tgattacgcc	tcgcattcgc	cgcagatcgc	gcaggtccag	36720
ggccggcttc	tggaccggct	gggcgaagtc	gggtccgaac	ctgctgagat	cgctttctac	36780
tcgacggtca	ccggcgagcg	gacggacacc	ggccgactcg	acgccgacta	ctggtaccag	36840
aaccttcggc	agcccgctcg	cttcacgacg	accgtcgccc	ggatggcaga	tcagggtctat	36900
cggttcttcg	tcgaggtgag	ccgcgacccg	ctgctcaccg	ccggaatcca	ggaaacgctg	36960
gaagccgcgg	acgcggggcg	ggtggtgggtc	ggttcgctgc	ggcgtggcga	gggcggctcc	37020
cggcgctggc	tgacttcgct	ggccgagtg	caggtgcgcg	gactgccggt	gaattgggaa	37080

caggtattcc	tcaacaccgg	agccccgacgc	gtgccgctgc	cgacctaccc	gttccagcgg	37140
cagcgggtact	ggttggagtc	cgccgagtag	gacgcggggcg	atctcggttc	ggtagggcttg	37200
ctctccgccg	agcatcccct	gctcgggggt	gcggtgacgc	tgcccgatgc	gggcccgttc	37260
ctgctgaccg	gcaagctgtc	ggtcaagacc	cagccctggg	tgcccgacca	cgtggtcggc	37320
ggggcgatcc	tgctgcccgg	caccgcgttc	gtggaaatgc	tgatacgccg	cgcggaccag	37380
gtcgggtgcg	atctgatcga	ggagttgtcc	ctgacgactc	cgtgggtttt	gcccgcgacc	37440
ggtgcgggtgc	aggtgcagat	cgcggttggc	ggtccggacg	aggccggggcg	ccgctcggtc	37500
cgcgtgcatt	cctgtcgaga	cgacgccgtg	ccgcaggact	cgtggacctg	ccacgcgacc	37560
ggcacgttga	cctccagcga	tcaccaggac	gccggccagg	gccccgatgg	gatttggccg	37620
cccaacgatg	ctgtcgcggg	tccgctggac	agcttctacg	cccgcgcagc	tgagcggggc	37680
ttcgatttgc	gcccggcggt	ccagggggtt	caggcggctt	ggaagcgcgg	agacgagatc	37740
ttcgccgagg	tcggcctgcc	caccgcacac	cgcgaagacg	ccggcagggt	cggaatccac	37800
cctgctctgc	tggatgcggc	actgcaggcg	ctgggcccag	ccgaagagga	tccggacgag	37860
ggatggctcc	cgttcgcgtg	gcaaggtgtg	tccctcaaag	cgacgggccc	actttccctt	37920
cggttgccac	tcgttccggc	gggcgcgaat	gcggtgtcgg	tggtcacgac	cgacacgact	37980
ggccaagccg	tgctctccat	cgattcgtct	gtgctgcgcc	agatttcgga	caagcagttg	38040
gcagcggccc	gtgcgatgga	acacgagtc	ctgttccggg	tcgactggaa	gcgaatctcg	38100
cccggcgctg	ccaagccggg	ctcctgggca	gtgatcggca	atgacgaact	cgcgcgagcc	38160
tgccggtcgg	cacttggcac	ggaactccac	cccgaacctga	ccgggttggc	tgaccgcgcc	38220
ccggacgtcg	tgggtggtgcc	atgcggtgcg	tctcgccagg	acttggacgt	tgcttccgag	38280
gcacgtgccg	cgacacaacg	catgcttgac	ctgatccagg	attgggttggc	ggcggcgcca	38340
ttcgccggat	ctgcctggg	ggttgtgacg	tgtggtgccc	cgtcgacagg	tcccgcgag	38400
ggtgtttccg	acctggtgca	tgctgcgtcg	tggggtttgt	tgcggtcggc	gcagtcggag	38460
aaccgggacc	gattcgtgtt	ggtcgatgtg	gacggaaccg	ccgaatcatg	gcgtgcgctc	38520
gcggcgcccg	tcggttccgg	agaaccgcag	ctggcggtgc	gcgcgggtga	agtcgggggtg	38580
cctcgctcgg	cgcatgtgt	tgccgcgag	gacagccgga	tccagtgcc	cggtagggat	38640
gggacggtgt	tgatttccgg	cggtaggggc	ctgctggggc	ggttgggtgc	ccggcatttg	38700
gtggcggagc	gcggtgtccg	ccgcctgggt	ctcgccgggg	gacgcggctg	gagcgcggcc	38760
ggggtcaccg	acctggtgga	tgagttgggt	ggcctgggag	ctgcggtcga	ggtggcgagc	38820
tgcatgtcgc	gggatcgggc	ccagttggac	cggctgctga	cgacgatctc	ggcagagttc	38880
ccgctgcgcg	gagtggtgca	tgccggccggg	gcacttgccg	acggggtcgt	cgagtcgctg	38940
acaccagagc	acgtggcaaa	ggtgttcggc	ccgaaggccg	ccggtgcgtg	gcacctgcac	39000
gagttgactc	ttgatctgga	tctctcgttc	ttcgtgctct	tctcctcggt	ctccggcgctg	39060
gcgggggctg	cgggtcaggg	aaactacgcg	gcggcgaaac	cgttcctgga	cggcctggct	39120
cagcaccggc	ggacggcggg	gctgcctgcg	gtgtcgctgg	cttggggctt	gtgggagcag	39180
cccagcggga	tgaccggagc	gctcgatgcg	gcccggccgta	gccgcattgc	gcgcaccaat	39240
ccgcgatgt	ccgcgcggga	cgggttgcgg	ctgttcgaga	tgccgttttcg	cgttccgggc	39300
gaatcgcttc	tggttccggg	ccacgtcgac	ctgaacgccc	tgccgcgtga	tgccggccgac	39360
ggcgggtgtgc	ctgcgttgtt	gcgcgacctg	gtgccagcgc	ccgtgcggcg	gagcgcgggtc	39420
aacgagtcgg	cggacgtcaa	cggctcgggt	ggtcggctgc	ggaggctgcc	ggacctggat	39480
caggaaaccc	agctgttggg	tttgggtgcg	gagcatgttt	cggcgggtgct	ggggcatttcg	39540
ggtgcggctg	aggtcggggc	cgatcgtgct	ttccgggatt	tgggttttga	ttcgttgtcc	39600
ggtgtggagt	ttcggaaccg	gcttggcggg	gtgctggggc	ttcggttgcc	ggctactgcg	39660
gtgttcgact	atccgacacc	gcgggcggtg	gttcggttct	tgctcgacaa	actgattggg	39720
ggcgtggagg	ctccgactcc	cgcaccggcg	gctgtggcgg	cggtgactgc	tgacgatccc	39780
gttgtgatcg	tggggatggg	ctgtcgttat	ccgggtgggg	tgctcctgcc	ggaggagctt	39840
tggcgtttgg	tggccggggg	cttggatgcg	gtggcggagt	tcccggacga	tcgtggctgg	39900
gatcaggcgg	ggttgttcga	tccggatccc	gatcgtcttg	ggacctcgta	tgtgtgtgag	39960
ggtggcttcc	tgcgagatgc	ggcagagttc	gatgcgggtt	tcttcgggat	ttccccgcgt	40020
gaggcgttgg	cgatggatcc	gcagcagcgg	ttgctgctgg	aagtcgcttg	ggaaaccgtg	40080
gagcggggcg	ggattgatcc	gctttcgttg	cgggggagcc	ggaccggcgt	gttcgcgggg	40140
ctgatgcacc	acgactacgg	cgcgcgggtt	atcacgaggg	cgcgggaggg	tttcgagggg	40200
tatctaggtg	atggcagcgc	gggaggcgtg	ttttcgggtc	gggttgcgta	ttcgtttggt	40260
ttcgagggtc	ctgcggtgac	ggtggatacg	gcgtgttcgt	cgtcgttggt	ggcgtgcac	40320
ctggcgggtc	aagcactgcg	gtctggtgag	tgtgatctgg	ctcttgccgg	tgggtgtgacg	40380
gtgatggcca	cgcgggggat	gttcgtggag	ttttcgcgtc	aacggggctt	ggcggcggat	40440
gggcgggtgca	agtcgtttgc	ggcggctgcg	gatggcaccg	gttggggaga	aggcgcgggc	40500

ttggtgttgt	tggagcggct	gtcggatgcc	cggcgcaacg	ggcacgcggt	tctggcggtc	40560
gtgcggggta	gcgcggtgaa	tcaggatggt	gcgtcgaatg	gtttgacggc	gccgaatggg	40620
ccctcgcagc	agcgggtgat	cacgcaggcg	ttggcgagtg	ctggtttgtc	ggtgtctgat	40680
gtggacgccg	tggagggcga	tgggactgga	accaggcttg	gtgatccgat	tgaggcgag	40740
gctctgattg	ccacttacgg	gcaggggcgg	gatagcgatc	ggcgttgttg	gttggggctg	40800
gtgaagtcga	atattggtca	tacgcaggcg	gcggcgggtg	tcgctggtgt	gatcaagatg	40860
gtgatggcga	tgcggcacgg	gcagctgccc	gcgacgttgc	atgtggatga	acctacgtcg	40920
gaagtggatt	ggtcggcggg	ggatgtccag	ctcctcacgg	agaacacccc	ctggcccggc	40980
aacagccatc	ctcggcgggt	gggcgtgtcg	tcgttcggga	tcagcggcac	caacgcacac	41040
gtcatcctcg	aacaagcctc	gaaaacacca	gacgagactg	cggacaagag	cgggtcccgat	41100
tcggaatcga	ccgtggacct	tccagcggtc	ccgttgatcg	tgtcggggag	aacaccggca	41160
gcgctcagcg	ctcaggcgag	cgcattgttg	tcctatttgg	gtgagcgtgg	cgatatttcc	41220
acgctggatg	cggcgttttc	gttggcttcc	tcccgggcgg	cgttggagga	gcgggcgggtg	41280
gtgctgggag	cggaccgcga	aacgttgttg	tccgggttgg	aagcgtggc	ttccggtcgc	41340
gaggcttctg	gggtggtgtc	gggatccccg	gtctctggcg	gggttgggtt	cgtgttcgcc	41400
ggtcagggcg	gacagtgggt	ggggatgggc	cgggggctct	actcggtttt	tccggtgttc	41460
gctgacgcgt	ttgacgaagc	atgtgccgga	ctggacgcgc	atctggggca	ggacgtgggg	41520
gtccgggatg	tgggtgttgg	ttccgacggg	tccttggttg	atcggacgct	gtgggcccag	41580
tcgggtttgt	tcgcgttgca	ggttgggttg	ctgagcctgc	tgggttcgtg	gggtgtccgg	41640
ccgggtgtgg	tgctgggcca	ttcggtcggc	gagttcgcgg	cggcggttgc	ggcgggagtg	41700
ttgtcgttgc	cggatgcggc	tcggatggtg	gcgggtcgtg	cccggttgat	gcaggcgttg	41760
ccttctggcg	gtgccatgtt	ggcgggtggc	gctggtgagg	agcagctgcg	gccgttgttg	41820
gccgatcggg	ttgatggtgc	gggtatcgcc	gcggtcaacg	ctcctgagtc	ggtggtgctc	41880
tccggcgatc	gggaggtgct	tgacgacatc	gccggcgcg	tggatgggca	agggattcgg	41940
tggcggcggt	tcggggttcc	gcattgcgtt	cattcgtatc	ggatggacct	gatgttgacg	42000
gagttcgcgg	aaatgcacg	cagcgtggac	taccggcgtg	gcgacctacc	ggtcgtgtcg	42060
acgttgacgg	gtgagctcga	caccgcaggt	gtgatggcta	cggcggagta	ttgggtgcgt	42120
caggttcgag	agcccgtccg	cttcgcgcgac	ggcgtccggg	tgctcgcgca	gcaaggggtc	42180
gccacgatct	tcgaactcgg	ccctgatgcg	acgctgtcgg	ccctgattcc	cgattgtcat	42240
tcgtgggctg	atcaggccat	gccgattccg	atgctgcgta	aagaccgtac	ggaaaccgaa	42300
actgtggtcg	ccgcggtggc	gcgggcgcac	acgcgtggtg	ttccggtcga	atggtcggcg	42360
tatttcgccg	gcaccggggc	acggcgggtc	gagttgccga	cgtatgcctt	ccagcggcag	42420
cggtaactgg	tggaaacatc	ggattacggc	gatgtgacgg	gtatcggcct	ggctgcggcg	42480
gagcatccgt	tgctgggggc	cgtgggttgc	ctggccgatg	gtgatgggat	ggtgctgacc	42540
ggccggttgt	cgggtggggac	gcattccgtg	ctggcccagc	atcgcgtgct	gggcgaggtc	42600
gtcgtccccg	gcaccgccat	cctggagatg	gccctgcacg	caggggcgcg	tctcggctgt	42660
gaccgggtgg	aagagctcac	cctggaaaca	ccgctggtgg	ttcccgaacg	cgcggcgggt	42720
gccggtagtc	gtggccctgc	gggagggacc	acagtttcaa	ttgaaactgc	ggaagaacgt	42780
gtgcggacga	acgacgccat	cgaaatccag	ctgctggtga	acgcacccga	cgaaggcgg	42840
cggcgaagg	tgtcgtgtga	ttcccgcggc	gccggtgggt	cgagaggtgg	gggttggacg	42900
cggcacgcca	ccggcgaact	cgtcgtcggc	accaccgggt	gtagggcggt	tcctgattgg	42960
tcggctgagg	gtgccgagtc	gattgctctc	gatgagttct	acgtcgtctc	ggccggaaaac	43020
gggttcgagt	acgggcgggt	gttccagggg	cttcaggcgg	catggcgtcg	tggtgacgag	43080
gttctcgcgg	aaatcgcccc	gccggccgag	gccgatgcga	tggcgtcggg	atacctgctc	43140
gaccacgcgt	tgctggatgc	cgcgtgcag	gcgtccgcgc	tcggcgaccg	cccggagcaa	43200
ggcggcgcgt	ggctgcggtt	ctcattcacc	ggcgtcgaa	tttcgcgtcc	ggcagggacg	43260
atcagcagg	tgcggctgga	gaccaggcga	cccagcgcga	tatcgggtgg	cgtgatggat	43320
gagagtgggc	ggttgctcgc	ctcgatcgat	tctctcaggc	tacgaagcgt	gtcgtcggga	43380
cagctggcga	atcgggacgc	tgtccgcgac	gcgctgttcg	aggtgacctg	ggagccgggtg	43440
gcgacgcagt	cgacggaacc	gggtcgtggg	gccctgcttg	gtgatactgc	ctgcggtaaa	43500
gacgatctca	tcaaactcgc	aacggattcc	gccgaccgct	gcgcggatct	ggcggcgcta	43560
gccgagaaac	ttgattccag	cgcgctgggt	cctgatgtcg	tgggtctactg	cgccggagaa	43620
caggcggatc	ccggcaccgg	cgcagccgca	cttgcggaga	cccagcagac	gttggctctg	43680
ctccaagcgt	ggttggctga	gccgcggttg	gccgaggcac	gtctggtggt	ggtgacgtgt	43740
gcagcgggtga	cgacggctcc	gagtgacgg	gcattcagagc	tggcacatgc	gccgttgttg	43800
gggttggttc	gtgcgcgcga	ggtggagaa	ccggggcag	ttgtgctggc	ggacgtcgac	43860
ggaaccgcgg	aatcgtggcg	tgcgttgccg	agtgcgttgg	gctcgatgga	accgcagttg	43920

gccctgcgga	agggcgcggt	gcgagcgccc	cgcttggttt	cggtcgccgg	gcagatcgac	43980
gtgcccgcgg	ttgtggcgga	tcccgaacga	accgtgctga	tttcggggcg	cacgggcctg	44040
ttggggggcg	cggttgcccc	ccacctgggtg	accgaacgcg	gtgtccgcgg	attgggtgtt	44100
acgggcccgtc	gtggctggga	tgctcctgga	atcacccagt	tggtgggtga	gctgaacggc	44160
ctcggtgccg	tggtcgacgt	gggtggcgtgc	gacgtcgccg	atcgtgctga	tctggagtcg	44220
ttgctggcgg	cggtccccggc	ggaatttccg	ttgtgcccgg	tggtgcatgc	cgcgggggcg	44280
ctggccgacg	gggtgatcga	gtcgttgtca	ccggacgacg	tgggagcggg	gttcggcccc	44340
aaggcgggcg	gggcgtggaa	tctgcacgag	ctgactcgtg	atacggacct	gtcgttcttc	44400
gcgttggtct	cctcgcttcc	cggtgttgcc	ggcgctcctg	gtcagggcaa	ttatgcggcg	44460
gcgaacgcgt	tcctggacgc	attggcgcat	taccggcggt	cacagggact	gcctgcgggt	44520
tcgctggcct	ggggcctgtg	ggagcagccg	agcgggatga	cggagacgct	cagcgaggtc	44580
gaccggagca	ggatcgcgcg	cgccaacccg	ccgttgtcca	ccaaggaggg	attgcggctg	44640
ttcgatgccg	ggctggcgct	ggaccgggca	gcggtagtcc	cggcgaagtt	ggacaggact	44700
ttcctggccg	agcaggcgcg	gtcgggctcg	ctgcccgcct	tggtgacggc	actggtaccc	44760
cccatccgtc	gtaataggcg	ggctagcggg	accgagctcg	cggacgaggg	caccctgctc	44820
gggggtggtgc	gggagcatgc	cgcgcccggt	ctgggggtatt	cgagcgccgg	tgacgtcggg	44880
gtcagagcgcg	ctttccggga	tctgggtttt	gattcgttgt	ctggtgtgga	gttgcggaac	44940
cgccttgccg	gggtgctggg	gggtgcgggt	ccggcgactg	cggtgttcga	ctatccgacg	45000
ccgagggcg	tggcccgggt	cctgcaccag	gaactggcag	acgagatcgc	tacgacgcca	45060
gcgcccgtga	cgacgaccag	ggcaccgggt	gccgaagacg	atctcgtcgc	gatagtcggg	45120
atgggatgcc	gttttcccg	tcaggtgtcc	tcgcccggag	agctctggcg	tttgggtggc	45180
gggggctgg	atgcggtcgc	ggacttccca	gccgatcgcg	gctgggatct	ggcaggcttg	45240
ttcgatccgg	accgggaacg	ggctgggaag	acctacgtgc	gggaaggggc	cttcctcacc	45300
gacgccgatc	ggttcgatgc	gggtttcttc	gggatttccc	cgcgtagggc	gttggcgatg	45360
gatccgcagc	aacggtaggt	gctggagctg	tcctgggagg	ccattgaacg	ggcagggatc	45420
gatccgggtt	cgctgagggg	gagtcggacc	gggtgtgttc	cggggctgat	gtaccacgac	45480
tatggcgccc	ggttcgccgg	ccgagccccg	gaagggttcc	aggggtatct	cggcaatggc	45540
agtgtggga	gtgtcgcgct	gggcccggatt	gcgtactcgt	ttggtttcga	gggtcctgcg	45600
gtgacggtgg	atactgcgtg	ttcgtcgtcg	ttgggtggcg	tgcatattgg	gggtcagtcg	45660
ttgcgttccg	gcgaatgcga	tctcgccctt	gccgggtggt	tgacggtgat	gtcgacgccc	45720
gggacgtttg	tggaaattct	ccgtcagcgg	ggcctggcac	cggacggggc	gtgcaagtcg	45780
ttcgcggaga	gcgcggacgg	taccggttgg	gggtgagggt	ctggtttggt	gttggtggag	45840
cggttgctcg	atgctcgcg	gaatgggcat	cggtgttggt	cggtggttcg	tgggtcggcg	45900
gtgaatcagg	atggtgcgtc	gaatggcttg	accgcgccga	atggtccctc	gcagcagcgg	45960
gtcatccagc	aggcgttggc	gagtcgggtt	ctgtcgggtg	ccgatgtgga	tgccgtggag	46020
gcgcatggga	ccgggaccag	gttgggtgat	ccgatagagg	cgcaggctct	gattgctacg	46080
tatgggcgg	atcgtgatcc	cggtcggccg	ttgtggttgg	ggtcgggtga	gtccaacatc	46140
ggtcatacgc	aggcggcggc	gggtgttgcc	ggtgtgatca	agatggtgat	ggcgatgcgg	46200
cacgggcaac	ttccgcgcac	gctgcacgtg	gatgcacct	cctcgcagg	ggattggctg	46260
gcggggaggg	tccagctcct	gacggagaac	acgccctggc	ccgacagtgg	tcgccccctg	46320
cggtgggggg	tgctcgtcgt	cgggatcagc	ggcacciaac	cgcacgtcat	cctggaacag	46380
tccacggggc	agatggatca	ggcagcggag	ccggattcga	gtcctgttct	ggatgttccg	46440
gtggtgccgt	gggtggtgtc	gggcaaaaca	cccgaagcgc	tatccgcccc	ggcggcaacg	46500
ttggcgacct	atttggaacca	aaatgttgat	gtctcccttc	tggacgttgg	gatttcgctt	46560
gcggtgaccc	gttcggcgct	ggatgagcgg	gcggtggtgc	tggggtcgga	tcgtgacacg	46620
ttgttgtctg	gcctgaatgc	gctggctgcc	ggtcatgagg	ctgctggcgt	ggttacggga	46680
cctgtcggga	ttggtggccg	gaccgggttt	gtgttcgcgg	gtcaaggcgg	tcagtgggtt	46740
gggatgggccc	gccggttgta	ctcgaggttt	ccggcgcttc	ccggtgcttt	cgacgaagca	46800
tgccgagcgc	tcgatgcgaa	cctggggagg	gaagtccggg	ttcgggatgt	ggtgttcggc	46860
tccgacgagt	ccttgctgga	tcggactttg	tgggcgcagt	cggttttgtt	cgcgttgacg	46920
gtcggctctc	gggaattgtt	gggtacgtgg	ggtgttcggc	ccagcgtagt	gctggggcat	46980
tcggtcgggg	agctagccgc	ggcgttcgcc	gcaggtgtgc	tgctgatggc	ggaggcggct	47040
cggctggtgg	cggttcgtgc	gcggttgatg	caggcgttgc	cttctggcgg	tgccatgctg	47100
gcggtgtccg	cgaccgaggc	ccgagtcggc	ccgctgctcg	atgggggtgc	ggatcgtgtt	47160
ggtgtcgcag	cggttaacgc	tccggggctg	gtggtgcttt	ccggtgaccg	ggatgtgctc	47220
gatggcattg	ccggtcggct	ggacgggcaa	ggtatccggg	cgaggtggtt	gcgggtttcg	47280
cacgcgtttc	attcgcacgc	gatggatccg	atgctggcgg	agttcgccga	gctcgcacgg	47340

agcgtggact	accggtctcc	acggctgccg	attgtctcga	cgctgaccgg	aaacctcgat	47400
gacgtgggcg	tgatggctac	gccggagtat	tgggtgcgcc	aggtgcgaga	gcccgtccgc	47460
ttcgccgacg	gtgtccaggc	gcttgtggac	caaggcgctc	acacgattgt	ggaactcggg	47520
ccggacgggg	cgttgtcgag	cttggttcaa	gagtgtgtgg	cggagtccgg	gcgggcgacg	47580
gggattccgt	tgggtgcggag	agaccgtgat	gaggtccgaa	cggtgctgga	cgctttggcg	47640
cagacccaca	ctcgtgggtg	cgcggtggac	tgggggtcat	ttttcgctgg	tacgagggca	47700
acgcaagtgc	accttcccac	gtatgccttc	caacgacagc	ggtactggct	ggagccatcg	47760
gattccgggt	atgtgaccgg	tggtggcctg	accggggcgg	agcatccgct	gttgggtgcc	47820
gtggtgccgg	tcgcggggcg	cgatgaggtg	ctgctgaccg	gcaggctgtc	ggtggggacg	47880
catccgtggc	tggcggaaca	ccgcgtgtcg	ggcggaagtgc	tcgtccccgg	caccgcgttg	47940
ctggagatgg	cgtggcgggc	cggtagccag	gtcggttgtg	aacgtgtgga	ggagctcacc	48000
ttggaggcac	cgctgggtcct	gccggagcgg	ggcgctgcgg	cggtgcagtt	ggcgggtggg	48060
gctccggatg	aggccggccg	gcgcagtttg	cagctctatt	cccaggcgcc	tgatgaagac	48120
ggcgactggc	ggcggtattgc	ctccgggctg	ttggcccagg	ccaatgcggt	gccgcccggc	48180
gattcgacgg	catggccgcc	ggacggcgcc	gggcaggctc	atctggcgga	gttctacgag	48240
cgcttcgccg	agcgcggctt	gacctacggt	ccggtattcc	aagggtcccg	cgccgcattg	48300
cggcacggcg	acgatattct	cgccgaattg	gccgggtcac	cagacgcctc	gggtttcggc	48360
atccaccggg	cgctgctgga	cgctgcactg	cacgcgatgg	cgcttggtgc	ttcgcccagc	48420
tcggaagcgc	gtctgccgtt	ttcctggcgt	ggcgcccagc	tgtaccgcgc	tgaaggagca	48480
gcgcttcggg	tacggctctc	gccgctgggc	tccggtgcag	tctcattgac	gttgggtggat	48540
gccacagggc	gacgagtcgc	tgcggtggaa	tcgctttcga	cgcgaccggt	ctccaccgac	48600
cagatcgggt	ccggtcgcgg	cgatcaagag	cggtgctgc	acgtcgagtgc	ggttaaggctc	48660
gctgaatctg	cggggatgtc	tctgacctcc	tgcgcggtgg	tcggtttggg	cgaaccggag	48720
tggcacgctg	cgctgaagac	caactggtgtc	caagtgcagt	cccatgcgga	ccttgcttcg	48780
ttggccaccg	aggttgccaa	gcggggttca	gctcctggtg	cggtcatcgt	cccgtgcccg	48840
cgaccccagc	cgatgcagga	gctgccgacc	gccgcgcgaa	gggcgcagca	acaggcgatg	48900
gcgatgtctg	agcaatggct	tgccgatgac	cggttcgta	gtacgcgcct	gacccgtgct	48960
acgcattcgg	cgggtctccgc	agttgctgga	gaagacgtgc	tcgacctggt	acacgcgcgg	49020
ctgtggggct	tgggtccgcag	cgcgcaagcg	gagcaccggg	accgattcgc	cttgatcgat	49080
atggacgacg	agcgagcatc	gcagacggca	ctcgccgaag	cgctgactgc	gggagaagcg	49140
cagctcgcgg	tgcggtcggg	agttgtgctg	gcgccccgcc	tcggccagggt	gaagggtgagt	49200
ggaggtgaag	cgttcagggtg	ggatgaaggc	accgtgctgg	tcaccggcgg	aaccggcggg	49260
ctcgggggccc	tgctcgcacg	ccatctgggtc	agcgcccacg	gtgtgcggca	cctgttgctc	49320
gcaagtgcgc	gtggtctggc	ggcgcccggg	gcggatgagc	tggtggccga	gctggagcag	49380
gccggcgccg	acgtcgcggg	cgtcgcgtgc	gactcggcag	atcgggactc	gcttgccgcg	49440
ctggtggcgt	cgggtgcctgc	ggaaaaccgc	ttgcggggtg	tggtgcacgc	cgccggtgtg	49500
ctggatgacg	gtgtgctgat	gtcgatgtcg	ccggagcgct	tggaacgggt	gttgcgggccc	49560
aaagtggatg	ccgcgtggta	cctgcacgag	ctgactcggg	aactcgggtc	gtcggcggttc	49620
gtgttggtct	cctcggtcgc	gggcctgttc	ggcggtgcgg	ggcagagcaa	ttacgctgcc	49680
ggcaacgctt	tcctggatgc	cttggcgcac	tgccggcagg	cccaggggct	gcccgcgctg	49740
tcgctggcct	ccgggctgtg	ggcgagtatc	gatggaatgg	cgggcgacct	cgctgcggca	49800
gatgtggagc	ggctgtcgcg	ggcaggcatt	ggcccgcctt	cggcaccggg	agggtgtggc	49860
ttgttcgacg	ctgccgttgg	ctcggacgaa	ccgttgctgg	caccggtgcg	actggatgtc	49920
gaagcactgc	gtgtgcaggc	ccgatccgtg	cagaccggga	ttccggaaat	gctgcatggc	49980
atggcaatgg	ggccaagccg					50000

<210> 3

<211> 25360

<212> DNA

<213> Saccharopolyspora spinosa

<400> 3

ccgcactccg	ttcacttcca	gggttgagcc	ggtgcacgaa	cggctggccg	gattgtcgga	60
gggcgaacgt	cggcagcaag	tgctccagcg	cgtccgcgcc	gatatcgcg	tggtactggg	120
gcacggcagg	tcgagcgatg	tggacatcga	gaagcctttg	gccgagctgg	gtttcgactc	180
gctgacggcc	atcgaactcc	gcaaccgtct	cgtaccgcgc	accggactgc	ggcttcccgc	240

gacgctggcc	ttcgaccacg	gcaactgcggc	ggcaactcgcc	cagcacgtgt	gcgcgcagct	300
aggcaccgcg	accgcgcgcg	caccgaggcg	aaccgacgac	aacgacgcca	cggagcccgt	360
gaggtcgctc	ttccaacagg	cgtatgcggc	tggccggata	cttgacggga	tggattttgt	420
gaaggtcgct	gcccagttgc	gaccggtggt	cggttcgccct	ggcgagctgg	aatccctgcc	480
gaaacccgtc	cagctttccc	gtggtcccga	agagcttgcc	ttggtgtgca	tgccggcgct	540
gacggggatg	ccgcccgcac	agcagtacgc	gcggtatcgcc	gccgggttcc	gcgatgtgcg	600
ggacgtttcg	gtgatcccga	tgcttggatt	cattgcgggga	gaaccgctgc	cgcccgccat	660
cgaggtggcg	gttcggacgc	aggcggaggc	ggtgctgcag	gaattcgccg	ggggctcggt	720
cgtactggtc	gggcattcct	ccgggggctg	gctggcgcac	gaggtagccg	gtgagctgga	780
gcgtcgcggg	gtcgtcccgg	ccggggctcg	actgctggac	acctacatcc	ccggtgagat	840
cacgcccagg	ttctccgtgg	cgatggccca	ccggacgtat	gagaagctcg	cgactttcac	900
ggacatgcag	gatgtcggta	tcaccgcgat	gggcggttac	ttccggatgt	tcaccgagtg	960
gactccgacg	ccgatcggtg	ctccgacgct	gttcgtgcgg	accgaagatt	gcgtcgcaga	1020
ccctgaaggg	cggccgtgga	cagatgactc	ctggcggcca	gggtggactc	tcgcggtatg	1080
cacggtccag	gtgccggggc	accactttct	gatgatggac	gagcacgccg	ggtccaccgc	1140
acaggcagtc	gcgagttggc	ttgacaaact	caaccagcgc	accgctcggc	aacgctgacg	1200
ggcgctcctt	taggaccttc	tgggcggcac	cggccacccc	ggcggtgccg	ccttcctgtg	1260
tccaggctcg	ccgatcttga	cggcgcacga	tgcgcggcac	gcgcgctgat	cgtagttccg	1320
ctgccgctcg	tggccatcgg	cctggcgaat	catgtccttt	cgggcaacgt	caaacgaatt	1380
cgcccgagcc	cgcattccga	ggtgaggggc	acccttgggt	ggctgagccg	ctcaaggggtg	1440
cccctcacct	cgaaattegt	ccgatttggg	cgggtggacgc	aaccccgggtg	ggcgtgggtg	1500
gtctttcttg	ttgacagagc	ggtgagaagc	cgctgacaca	cctgagagga	aaaggggagc	1560
atgatgctca	agcgccaccg	tttgacgacc	gccatcacccg	gccttctggg	gggagtactg	1620
ctggtcagcg	gctgcggaac	cgccgcgcga	cttcagtcct	cgccggcgcc	cgggcatgac	1680
gcgcgcaatg	ttggtatggc	ctcgggcggg	ggcgggcggg	acatcggcac	gtcgaactgc	1740
tcggaggccg	atcttcctgc	caccgcgaca	ccggtgaaag	gcgaccccgg	cagtttcatc	1800
gtggcgtagc	ggaaaccggtc	ggacaagacc	tgacagatca	acggcggcgt	gccgaacctc	1860
aagggcgtag	acatgagcaa	ctcgccgatc	gaggacctgc	cggtcgagga	cgtagcggtt	1920
cccgcgcgcg	ccaaggaatt	caccctccag	cccggtcaga	gcgcgtacgc	cggcattggc	1980
atggtcctgg	ccgacagcgg	cgacccgaac	gcccattgtcc	tcaccgggtt	ccagtcctcg	2040
ctgccggaca	tgtccgaggc	ccagccgggtc	aacgttctcg	gcgacggcaa	cgtgaagttc	2100
gccgcgaagt	acctgcgagt	cagctcgctg	gtgtctaccg	cagacgagct	gcgctaaaac	2160
ccatgtgagt	cccgcagatt	cgacctcgcc	gtgcggcgcc	tcgggcgaag	cgtccgtacg	2220
tttgtcgttg	tgaccagcgt	tgttcacgtc	cgggcgcagc	gctggtacat	actcaggcgt	2280
ctcgggcgcg	tccaacgggg	cctggcatcc	ggggccgctg	agtgcggcgg	cgctgacgcg	2340
ttctctgtcg	ggcgttgtca	cgccgcgggc	ctcgaaccgg	tcccgcgccg	tcggagccgg	2400
tgggtccagcg	cgggtgtggcg	gcggccggag	ccgacgggtg	gcaccgcctg	cccgagggcc	2460
tttttcgaac	cgacgaggac	cacgaccttc	ttggcccggg	tgaccgcctg	gtagagcagg	2520
ttgcgctgca	gcacatcca	ggcgcttgtg	gtcaagggga	tcaccacgca	cgggtattcg	2580
cttccctgcg	aacgatggat	ggtcacccgc	taggcgtgga	ccagttcgtc	gagttctgtg	2640
aagtcgtagt	cgatgtcctc	gtcctcgctg	gttcgcacgg	tcattggtctg	tgcttcggtg	2700
tcgagggcgg	acacgacgcg	ctgcgtgccg	ttgaacacgc	cgttggcgcc	cttgtcgtag	2760
ttgttgcgga	tctgcgtgac	cttgtcgccg	acgcggaaga	tccgtccgcc	gaaccgcgcg	2820
tctggcaggg	cctccctggc	cggggtgatc	gcttcctgca	acagctggtt	cagcgccctc	2880
gcacctgcgg	ggcctcgatg	catcgggggc	aggacctgca	cgtaggtgcg	cgggttgaac	2940
cggaaacttc	gcggaatccg	gcgggcgacg	acgtcgacgg	tgagctcggc	ggtaggttcg	3000
ctttcctcta	cgtggaacag	gaagaagtgc	gtcagcccg	gtgtcagcgg	atagtccccg	3060
gcgttgattc	ggtgcgcgtt	ggtcaccacc	ccggactcgg	cggcctgccg	gaacacctcg	3120
ttgagccgca	cgtgtggaat	cggggtgcc	ggggcgagca	gatcgcgag	tacctaccg	3180
gctccgaccg	acgggagctg	gtcgacgtcg	ccgaccagca	gcaggtgcgc	gccgggcgcg	3240
atcgcccttg	ccagtttggt	ggctaacagc	aggctgagca	tggacgcctc	gtcgaccacg	3300
acgaggtcgg	cgtccagcgg	gttgtcccgg	tcgtaggcgg	cgtccccgcc	cggctggagt	3360
tggagcaggg	ggtgcacggt	cgccgcgtcg	tgtccggtga	gctcggtcag	ccgcttcgcc	3420
gctcgtcccc	tcggcgcggc	gaggatcacc	ttggcccttt	tcgcctgagc	taatgcgatg	3480
atcgaccgca	cgggtgaagct	cttgccgcag	cctggacctc	cggtagcac	ggcgaccttc	3540
tcggtcaggg	ccagcttgac	ggcgcgctcc	tgcgccctcg	cgagttcggc	accggtagcg	3600
cggcgcaacc	agtcgagggc	cttgtgcca	tcgacgtcgg	cgaagacggg	catccggtcc	3660

gcgctggtgt	tcagcagccg	ggacagctgg	ttggccaggg	cgacttcggc	gcggtggaag	3720
ggcacgaggt	agatcgcgac	cgtcggcacc	tcgtcgtcat	cgggtggggat	ctcctcgcgg	3780
accacacctt	cctcggtgac	gagttcggcg	aggcattcga	tcaccagccc	ggtgtcgacg	3840
gcgaggatct	tcaccgcctc	ggcgatcagc	tcgtttctccg	gcaggtagca	gttgccgtcg	3900
ccggtggact	ccgacagcgt	gaactgaagg	cccgccttta	cccgtcgcgg	ggagtcgtgc	3960
gggattccca	ccgctttggc	gatggtgtcg	gcggtcttga	aaccgattcc	ccacacgtcg	4020
cctgccagcc	ggtatggctc	ttccttgacg	gtccggatcg	cgtcgtcgtg	gtactgcttg	4080
tagatcttca	ccgccagcga	ggtcgagacg	ccgacgcctt	gcaggaagat	catcacctcc	4140
ttgatccct	tctgtctctc	ccacgcgtcg	gcgatcagct	tcgtccgctt	cgggccgagc	4200
ttggggacct	cgatcagccg	cgcgggttcc	tgctcgatga	cgtcgagcgc	ggcgacgccg	4260
aagtggctga	cgatcttctc	ggcgagtttg	gggccgatgc	ccttgatcag	gccagacccc	4320
aggtagcggc	ggataccttg	cacggtcgca	ggcgacagcg	tcgtgtagtc	gtcgacgtgg	4380
aactgccgcc	cgtactgggg	gtgcgacccc	caccggccgc	gcatgcgcaa	cgcctcgcgc	4440
ggctgcgcgc	ccagcagcgc	gccgacgacc	gtcaccaggt	caccgccccg	gccggtgtcg	4500
atccgcgcga	cgggtgtagcc	gctctcctcg	ttggcgaacg	tgatccgctc	cagcgtgccc	4560
tccagcaccg	cagtcacacgt	ggccgactcc	cgtccttttt	ccaccgacaa	cacgtatcac	4620
gaacggctgt	caagcaaac	ggcggtcacc	acatgcagcg	gcatctcccg	aacgcctcgg	4680
gctccggcgt	cagcgggtgg	gcgttcgcga	tgcttgggtg	cggccgggtg	gagttgtaga	4740
ttttttcgtc	ctcgcgcagg	gcctggagta	ggtgccgctg	gctccagatc	aggggaaagc	4800
gccgggataa	accggcttga	cggaggagat	ggaagagctc	tacgtcgaat	ggccagcgac	4860
ccacgacgac	cccaggtcat	gcgtcgacga	cctgcgaggc	cgtggcgaag	cgttgacagg	4920
gggcacgtgg	gggcgtgcga	tcaggtcgcg	gcgcgggtc	agcgccgtgt	ccggacgcac	4980
cagcagccgc	gacggactgg	ttccgctcct	cgagcgcggg	gtcctcgatc	gtcttttttcg	5040
agctcgatgc	cggccgcggt	cgcgaggtgg	ccagtccagt	cggtcggcag	tcgtggtcgc	5100
agtctgcctt	ttgaacatct	ggtcaattca	cctttgaatg	atcgttcggc	gagtatgtgc	5160
ctgcccccga	attgtttgct	cgcgtgcgc	gctgggacag	gagcgcggcg	ttcggggagc	5220
gcgtgctggc	aagggtgtcg	attggctcgg	acggccggac	caggatcgcc	gacgtcgtga	5280
tcgccacgag	cgtcggcgat	gcccgggtact	atctggagca	ccagcgagtg	gacaacgact	5340
tccacggggc	cgggtgcgtc	ctgatcatga	atcaagaact	gagaccgtca	gggtgaacgt	5400
gccgtcgtgg	ggcactgtga	ggatgtgcat	cacacggccg	gggtaggtga	tcgaggaggc	5460
cctgatcgcg	ggctgccgcg	gctgtgcccc	gtcgaatcgc	agcaccacct	ggccgcgggt	5520
gagcgtcagc	ccctgcgcgt	cgagtgcgac	tttgtcggag	tcctcacca	ccaacgggat	5580
ctgctcgggt	gccgggtgct	tcgcctgcac	cgacctggtg	atccggtcgg	gccgcacggg	5640
cacatcggtg	acgaccgagc	cattcgcggt	gcggtagcgg	aaccggatat	gctcgccgcc	5700
caggaactcc	gcctgctgcg	gtccgttcgc	gtccggcacc	tgggccggga	agaccgtcgc	5760
ccagcaggcg	tggctcgttgt	tgttcatcga	ctggacgacc	gtgcccgcga	ccgggtgcca	5820
caggaacgtc	agaccggtgc	ggcccagcga	ggtcgcgcgc	ctcgtgccga	agtagccgcc	5880
gaggtagaac	tgccggcctgc	gtaggaacag	gaagtcttgc	ccctgggtcg	tgccgatctc	5940
ggtgaagtgc	gcctgttggg	atggaagttt	cgcgatcgcg	gccgtgcgct	gggcgcgggt	6000
cggatagcgc	tcgccgtaga	tcgcgtgggt	gaggatgcgc	ggtgaggtgt	cctgtttgac	6060
gagtgcgggc	accggtgccg	ggtcctcggc	ccaggccgct	cgtgcggcgg	cgaggtcttc	6120
gcggctggac	aggaacgcgc	ccaagtccgg	caccactggc	acgaactggg	tgttcagcgc	6180
ggtacgttcc	gggtccggtc	gcacgtcggc	gtagaaccgc	gccgaggtgc	gggagttggg	6240
ggcgacgttg	gcgaaccagc	cggagccgtc	gggttcgcgc	agcaggttgt	agctgagcca	6300
gtcgggtgac	ttccgcgccca	tcgtgacgag	ggttgccgtt	ttggactggc	gccacgcgtc	6360
ggccatctcc	ggcagcatca	cctcgaagtt	gtagttgggt	tcgcgcgcgg	tcaactcgta	6420
gaagtagccc	gaaggactct	gcccgttcgc	ggcaaggcgc	gcgaacgcct	cggccaactg	6480
ctgccgcagc	gcgggggtcgg	ggtcctgggt	cagcgcgagc	gaggagccgg	cgagcccggc	6540
ggtaacctgg	ttcgcgtagt	ggattgtggg	ctgccaggcg	ctaccgttgc	ccgggttgag	6600
gagccacgtc	atcgctttgc	gcagcgcgga	ggtgatctgc	gactggcgtt	gcggcaggat	6660
gttcgccgcg	cgcagcaggg	cgttgggtctt	gctcaggtac	cccaaccgga	agccgggtgg	6720
ggcgagcccc	tgctcgggtc	gcgaatactc	cggccacgag	ccgtcatcgt	gctgcaaccc	6780
taggtagtgt	ccgagccccg	cgtcgagcgc	ggcgagcaga	gtcgcgtcgc	cccgggtacg	6840
gttccacgtg	cgggatttgc	tggcgaacca	ggcgagcgtg	tagacgtgct	cctggacgcg	6900
ggcgtttag	gacaccgccg	ggctgcgcca	ccagcctccg	gcgaagaagc	cgctcgagtc	6960
catgtcggcg	accatcggcg	agaccgcggt	gaggtacgac	gcgaatcgct	gctcctcggg	7020
tgccaacagg	cgcgggttcg	gtgtgggtggg	cggcggggcg	ggcagtgcca	gtgcgcgggt	7080

cggcagtgcg	gcgagcagtc	cgagagcggc	ggcgccggtc	atcaggctgc	gacggctgaa	7140
cgtagtcacg	ggcctacctc	cttgtggccg	atcaaccctc	acccgctgcg	tagccgcacg	7200
tcaagatgat	aattcgaatt	attatgggct	tgacgacgcg	taggccgacg	acgcagaatt	7260
cctgccaat	cgtattggca	agcgggggtg	ctcgtggccc	gacggctcac	ccagcaggac	7320
atcgcccga	tggcaggagt	cagccaggcc	acggtgtcgc	tgggtgtcaa	caaccggaag	7380
gacggcaacg	tccggatcgc	ggcggagacc	cgtgcgcagg	tactggaggt	gattcgggaag	7440
accggctacg	tcgcgaaccc	gatcgcccgc	aggatgcgcg	atcggcacaa	ccgcatactc	7500
ggcgtgttca	cctacgaggc	ggtgttcccg	agcaccacacg	cgaacttcta	ccagtgcgtc	7560
ctcgaaggca	tcgaggaaca	ggcggaggag	gtcggctgtg	acctgttggt	gttcaccagc	7620
gccaaaggcca	cgggggagcg	gcggcggtatt	ttcggcgacg	acagccgggt	gcggctcgcc	7680
gacggcagtc	tgctgctcgg	tcgcacggtc	gaccgcgacg	acctgaccca	gctgctcgcc	7740
gaaagcatcc	cgtacgtctc	catcggaaga	cgcgacgacg	cgggcgggtcc	ggtgccgcac	7800
gtcggggccg	actaccgcac	cgcggtgcga	gacctggtgg	accgcgcggg	cgcgctcggc	7860
caccgcgggt	tcgcgtacgt	ggggctctggt	gggggcgcgg	agtcgtccgc	ggatcggtcg	7920
cgaggcttcc	gcgaagccgt	tgcgcacat	ggcgtccaag	ggatgcatgt	ggagacccca	7980
cagctcgatc	agctgcgcga	agcgggcgtc	accgctgtgc	tcaccgaaga	ggtgtcggac	8040
ggggccgcgc	tcgtgctcgc	cgggcgcgaa	cgcgggctct	ccgtgccggg	cgacctcgcc	8100
gtgctctcgc	tcggtgccgc	taccgggtcg	gcaccggacg	acgacgtggc	gctcaccggg	8160
ttccgcatcc	ccaggcgcg	gatggggcgc	cgggcgggtgc	aggcgctgac	cgaggtgctc	8220
gaaaacggca	ccacaccgca	agaactgctc	ccgtgcgagt	tcgtcgaggg	ctcgacgctg	8280
ggcgccacc	gcctttgacc	aggaggaact	gttgctcgac	cacaccacgg	acgttgctcg	8340
cgttggcggc	ggactcggcg	gtgtcgccgc	cgcactcgcg	ttgctgcgcg	cgggcgcgcg	8400
ggtcgtgctc	accgaggagt	acgactgggt	cggcggccag	ctgaccagcc	aggccgtgcc	8460
gcccagacgag	cacagctggg	tggagcgctt	cggcgtcacc	gcgagctacc	gggcgttacg	8520
cgacggcatc	cgcgactact	accgcgcgca	ctaccgcgtg	acccgcgcgc	cacgggcgtg	8580
gcgggagctc	aaccccggtg	cgggcaacgt	gagcaggtc	tgccacgagc	cccgcgtcgc	8640
cgtcgcgggtg	atgcacgaga	tgctggcgcc	gttcgcgggc	agtggcaggc	tgaccgtgct	8700
gcagccgtac	cggccgggtg	ccgcgcacaa	gcagggcgac	cggatcgtgt	cggtgaccgt	8760
tgcgaccgc	gacaccgggtg	aacagatcga	gctctccgcg	ccgtacatcc	tggacgcgac	8820
ggagacgggt	gaactgcttc	cgttgtccag	cacggagtac	gtcaccgggt	tcgagtcac	8880
tctggacacc	ggcgagccga	gtgcgcccga	cgtcgcgcag	ccggcgaaca	tgcaggcggt	8940
gtcgggtgtc	ttcgtgggtc	accacgtcga	cggcgaccac	accatcgaca	aaccggcgcg	9000
gtacgacttc	tggcgcgcg	accagccgga	cttctggggc	gaccggatgc	tgtcgttccg	9060
ctcccccaac	ccgcgcacgc	tcgcgatctc	cgaacgtacg	ttcaccgccga	acccggacga	9120
cgacccgctc	ggcgtcgtgt	cggaccagcg	gctcagtgcc	ggtgacagca	atctgtggac	9180
gttccggcgc	atcgccgcgc	gtcgcaactt	cgtcgagggg	gcctacgaca	gcgacatctg	9240
cctggtgaac	tggccgatca	tcgactactt	cgagtgcgcg	gtgatcgacg	tgccggacgc	9300
cgacgcgcac	atcgccgcgc	cgcgggaact	ctcacgttcg	gtgctctact	ggctacagac	9360
cgaggcgccg	cgcccagacg	gcggcaccgg	cttccccggc	ctccgcctgc	gcggcgacgt	9420
caccggcagc	gcggacggtc	tcgcgcaggc	gccgtacatc	cgcgagtcca	ggcgcatcag	9480
ggccgagcac	acgatcgtcg	aacaggacct	ctcgtcgcgc	gtgcgcggcg	acaaggggtg	9540
ggtgcagcac	gccgacgccg	tgggtgtcgg	catgtaccgt	atcgacctgc	acccctccac	9600
cgggtggcgac	aactacatcg	acgtcgcgag	ctgcccgttc	gagatcccgc	tcggcgcgct	9660
gatcccgcga	cgggtggaga	acctgctacc	cgcgggcaag	aacatcggca	ccaccacat	9720
caccaaeagg	tcccaccggc	tgcaccaggt	cgagtggaa	gtcggcgagg	tcgcgggcgc	9780
gctcgtgccc	ttctgcctgg	cgcaccaggt	cacccctcgc	gcggtgcgca	atacccttg	9840
cctgctcgcg	gacttccagc	agtgtctgga	acgcgacggg	gtcgagctcc	gctggccgga	9900
cgtgtccggc	tactgacgca	gggagacgaa	aatgacaaag	ctgtcacgac	gactcacggc	9960
actcatcgtc	gcagggtgtg	tcgccctcac	cggctgcggg	ggtggatcaa	ccgcacagtc	10020
cggaccgaag	tcgtgcgca	tgaccgtgtg	gactgccaac	gcggcgcatc	tcaagctgct	10080
caacgacatc	gccgccgagt	acaaggcctc	gcacccggac	atcgccgaga	tcaagttcga	10140
ctcggtgccc	gccgacgggt	acaccaccac	gctcaccacc	cagatcgccg	gcggtaacgc	10200
gccggacctg	gcctggatcc	tggaggagtc	ggcaccggac	ttcgtggcgt	ccggtgcgct	10260
cgccccgggtg	cgcggcaaga	tcgagaaggc	cgacgagctc	gtgccgtccg	cgacgaagct	10320
gtggggagaag	gacggcgaac	tgtacgccta	cccgttctcc	acctcgccgt	tcggcttggt	10380
cgtcaacacc	gacctggtga	agggcgccctc	ggcggaactgg	acctgggacc	aggcgatcgc	10440
ggctgcctct	gcgtcggcgg	ccgcctccgg	caagggcggc	ctggtactgc	cggacttcaa	10500

gtaccagaac	tgggcagtg	tgtcctctat	ctggcgcggc	tggggagctg	atgctgagg	10560
cgcggacggt	cgtcgtg	ggttctccag	cagcgagatg	aacgacgga	tgtccttctt	10620
gcacaaggcc	atcttcaccg	acaaggcgat	tccgggcccc	ggcagcagcg	tggacttctt	10680
cgcggcgac	gcggcgatgg	cgatcggcca	gatctcccg	tccagtgcgt	tgaaggacgc	10740
gaagttcggc	tggacgctgc	tgccgctgcc	ggcgggtccg	aagggtgact	acgcgggtgat	10800
cgggcaggcc	gggatcgggtg	tgctgaagca	gtcgcacaac	gtcgcgccc	cgacggactt	10860
cctcgcttc	ctcaccaacc	agaccaactc	cgccaagctc	gcgcagttct	tcccccggc	10920
gcggtcgtcg	ctgctcaacg	cggagacgct	cgccaagagc	aaccggtga	tcaaggccga	10980
gcaactgcag	tccgtcgtcg	tgcgagcgat	caacaagggc	gtcgtgaagc	cgagccacaa	11040
gggtcaggag	gagctgaacc	agacgatccg	cgcgcgctc	gaccggtgt	ggaagccgga	11100
cgcgaacgtg	cagaacgtgc	tgaacgacgt	gtgcaccaag	atcaaaccgc	tgtggagaa	11160
caagtgcgg	cggtcgcaca	ctccacgcgg	gccgtagccc	gcaaggggac	gtcgtactgg	11220
acgcagcgca	ggcgcgacaa	tctggttgg	tacctgttcg	tgcgcccgc	gctgctcggc	11280
agcatcgct	tctgctgg	gccgctggcc	ttggtcggct	ggtacagcct	caacgagtgg	11340
aacgtgctcg	cgggcacgtt	cgagttcgtc	ggcgcgcaga	actaccaaca	gctgctcgcc	11400
gacgagaagc	tgcgcgactc	gctggtggcg	accacttggt	tgcgcgcgg	cctggtcgtg	11460
ctcaacctgt	cactagcgct	gctgctggcc	gtgctgctca	accagaagct	gagcggcacc	11520
acggtcttcc	gcacgttggt	cttctctccc	gtcctcgtgt	cgtggtggc	gtggacgctg	11580
gtgtggcagc	tgatactgca	gccggagggc	agcgtcaacg	gactgctcgg	gttcttcggt	11640
gccgacgggc	cgaactggct	gcgcggtgag	tgcacgcga	tggctcgggt	gatcgtcgtg	11700
caggtgctca	agaacgtcgg	cctgaacatg	gtgctgttcc	tgcggcgct	gcaaggcgtg	11760
ccgcagccgt	tgtacgaggc	ggcgaagatc	gacggggcgg	gtgcctggac	ccggttccgc	11820
cgcacacct	tgccgttgat	cagcccagcg	atcctgctca	cgtcgatcat	caccatcgtc	11880
ggctcgtcgc	aggtgttcgc	gcagatcgcg	gtgctcacgc	agggcggtcc	gggcacgtcc	11940
acgacgtac	tgatctacta	cctgtaccag	caggcgttcc	agttccacca	cttcggctag	12000
ggcgcgacga	tctcggtact	gctgttcgtc	atcgcgccg	cactcaccct	gctgcagtgg	12060
cagatgcgcc	ggaagtgggt	gctgcatgag	gcttagggtc	aagatcacgc	tatacgggct	12120
gctgtgcctg	ctgtgcgtgc	ctttcgtggt	cccaacctgg	tggatgatca	cctcgtcgat	12180
gaagcccac	agcgagatct	tctccacctc	gccgctgccg	tcgagtgga	cgttctccac	12240
ctaccggcag	gtgttcgaga	tgcagccgtt	cgcgcagcag	tactggaaca	gcctctacat	12300
cgcggtgatc	gtcacgacag	gcacaatggc	ggtggcgggc	atggccggat	acgcgttcgc	12360
gcgtatccgg	ttcccggggc	agaacgtgct	gttcgtggtc	gtcctgatcg	gcctgctcat	12420
cccgagcgag	gtcaccatcg	tgccgctggt	caagatgttc	cagtcgctcg	gcctgaccaa	12480
cacgcactgg	ccgctaatac	tctgtccgat	cttcggggcg	ccctgtgtgc	tggcgatctt	12540
catcatgcgc	cagttcttca	tgcacctgcc	gtcggagctg	gaggaggccg	cgcggatgga	12600
cggcctcgga	cgagcgggca	tcttctaccg	ggtggccctg	ccgtgtccc	ggcccgcgct	12660
gggcgcgctc	gcgatcttca	cgttcctgca	ctcgtggaac	ctctacctgg	agccgatcgt	12720
ctatctgtcc	acaccggaca	tgtacacgtt	gccgcaagcg	ctcacgcagt	tgtcgacaa	12780
ctacggcggc	ccgatgtgga	acgtgcagct	cgcgcgcgcg	accatgaccg	cagtgcgat	12840
tctcgtcgtg	ttcgtgctgg	cgcagcggca	gttcacgcag	ggactcgcgc	acaccggggt	12900
taaggggtga	gtcccgcgat	cgacccggag	atcgccgcgc	tggtagacct	cgccagacca	12960
ccggtgacgc	cagcgggaat	cgacgcggtc	cgggcgggag	gacgcgtcgt	caccgatgcc	13020
gagctgacgc	gcggtggcac	cgtgacgttc	gccgatgccg	atgccgatgg	cgtgccgctg	13080
cttgtgctgc	gcccagcggg	tgtgccacgt	cttcgggtgc	tgcacctgca	cggcgccggg	13140
atggtcgcgg	gcaccggcg	caccgacctg	cacgtgctgg	ccgagtgggt	gtcggagctg	13200
ggtgtcgtgc	tgggtgcgcc	ggagtaccgg	ctcgcacctg	agcaccgcga	cccggcgccg	13260
tgcgaggact	gcttccgggt	gctggagtgg	atgtcccgcga	acggcttcgg	ccgcctgtc	13320
gttgccggta	catcggcggg	cggcgggctg	gcggctgcgg	tgcgctgat	ggcccgcgac	13380
ctcggcggtc	cgcgatctt	gccgtcggcg	cgcaactgct	cgaacgcgtc	cagcgtctcc	13440
gccaacggcg	tgtaccgcg	ccagtgcagc	aggtagacgt	ccaggtgatc	ggtgcccaac	13500
cgcgcgagac	tgcgttcgca	cgcctcgacg	gcgccacgcc	gaccgcggtt	gtgcggatac	13560
accttgctga	ccaggaaaac	ctcgtcgcgg	cgcgcggcga	tgcggccacc	gacgacctcc	13620
tccggcggcc	cgtgcgcgta	catctcggcg	gtgtcgatca	gccccaggcc	gaggtccagg	13680
ccgcgcgcga	gcgcggcgac	ctccgcgcgg	cgtgcgccac	gccgtcccc	catgccccag	13740
gtgccctgcc	ccagcaccgg	caattcctgc	ccgccacgca	gttgaaggcc	tgcgatgcac	13800
actccgtttc	agtcagcgct	gctgcggcag	cacggccacc	agctcgaagc	caccgtcctc	13860
ggacggcccg	gcggccaacc	gcccaccggc	catctgcacc	cgtccgaca	ggccggccag	13920

cccggacccg	ccgtgcccga	cctcgatggc	cgggtcccgc	cggtcggggg	cgccgtttgt	13980
gacggcgacg	tgcagcgagc	cctcgcgga	caccagccgc	accttgatgt	cagcaccggg	14040
tgcgtgcttg	gaagcgttcg	tcaacgcctc	ctggacgacc	cggtaagccg	cgcgtcaac	14100
cgcaggcgac	accccggtcg	ggtcgcggtat	ctccgaggaa	agctccacat	ccacaccggc	14160
ggcgcgcgcc	cgcacgacca	gctccgggat	cgtgctcaac	ccggcccgcgt	gcctgggggc	14220
gccgagcccc	agcgtcgcgc	gcatctcgtc	cagcgccgtgc	ttcgccaacc	cgcgcagccg	14280
cccggcggtc	tccttcgcac	cgggatacctc	ggtggtggcc	gccaacgcgc	ccgactcgac	14340
cgcgattaag	gtcacgtgat	gtcccaccgc	gtcgtggatc	tcccgcgcga	tccggggccg	14400
ctcctccgcg	cgcgcgcgtc	cggccttcgc	ctgcaactcc	gcctcggtgg	ccgcctccag	14460
cttcgcgaga	ctgtccgcca	gctgtcccg	caacgccacc	agcgcccca	atgccgtcgg	14520
cgcgcctgcc	gccagcgaca	cgaacgccac	ggtcaggatg	atcgaccgga	cccccagcga	14580
ctgcatgata	atcacccggtg	ccacggcgac	gcgcgcggtc	agcaacaccc	agccgaccaa	14640
catctggata	cgcgggtgcg	cgcgccccaa	cgcgtacaac	gccacgaccg	tccggcgcca	14700
acccaaacca	ccggccaacg	ctggcatgca	cagcagcacc	gcgatccgcg	gccaccgcgc	14760
caacggcagc	agcgccgaag	ccaccaaacc	ggacaccgtc	gcatagccga	acgggtcggg	14820
cgcggccagc	acagctgccg	ccggaatccc	gacgaccagc	gcctcaacgc	cgaagccgaga	14880
ccagcgcacc	gaactcaccg	gaagccgccc	gccacgcgct	gcgcgatcaa	cgcggcctgc	14940
acccggttct	gcgcgcgag	cttgcctaac	accgtcgaca	cgtagctctt	gaccgtcgcc	15000
tcggtcagcc	cgaagccggac	cccgatatcg	gcgttggacc	gaccatccgc	caacaactgg	15060
agcacctgcc	gctcccgcgc	ggacaacccc	tgcaccagct	gcgtctcgtg	cgcgttgctg	15120
gacagactgc	ggaacctggg	caacaaccgc	gcagtgatcc	gcggatccag	caccgcccc	15180
ccggcgcgca	gatcgtgcac	cgcgcgaacc	agcacccgcg	gctccgcgct	cttgagcagg	15240
aaccgctgcg	ccccgaaccg	caaggcatcg	gccacgtaat	cgtccagggtc	gaacgtcgtc	15300
agcacccgcg	gcaccggcgg	attcgccaac	gtcgccaagt	cccgaacgc	cgtcagcccg	15360
tccttgccgg	gcatctgcac	gtcgatgagg	gcgacgtcga	cgcggtacgc	gcgcaccgcg	15420
gccagcaact	catccccgtt	gcccgcctcg	gcgaccaccc	ggatcgagcc	gtcgccctcc	15480
aacaacaccc	gcagccacgc	ccgcagcatc	gcctcgtcat	cggcaagcac	aacgcggatc	15540
ggccccccgc	cgtcgtcagc	ccgcacctct	cggtcacctc	cctgttccga	gggtcgccag	15600
cagactagcg	gggcccgcga	agcgcagcgc	acacgccacc	cgaagcgcact	gtgtcagcgg	15660
cgcgcgcctt	tggccttcgc	ctcccgcacc	cgcaccgaga	tcgcaccggg	gtaccaccag	15720
aaccggaacg	tctcccggaa	cctgcgctcc	aggaaccgcc	ggtaccgggc	ctccaagaac	15780
ccggtggtga	acagcacgat	cgtcggcggc	cgcgactgcg	cctgggtggc	gaacaggatc	15840
ttcggctgct	tgcgcccccg	caccggcggc	gggttggccg	cgaaccagctc	ggaaagccaa	15900
ccgttcaacc	ggccgggtgga	gatccgggtg	tcccacgaat	ccagcgcctg	gcgcagcgtc	15960
ggggccagtt	tcgccaccgc	gcgaccggtc	ttcgccgaca	cgttgaccgc	ctcggccccc	16020
cgcaccgcga	ccagctcgcg	gtcgatctcc	ttctccaact	ggtggcggcg	gtcctcgtcg	16080
accaggctcc	acttggttga	ggcgatcacc	aatgcccga	cggcctcgac	gaccatagtg	16140
atcacccgca	ggtcctgctc	gtcacaacgc	tcggagccgt	cgatgagcac	gatcaccacc	16200
tcggcgcgct	cgatcgcggc	cttgggtgcg	agcgacgcgt	agtactcggg	gccgcttgcg	16260
gtcttcacgc	gcttgcgcg	ccggcgggtg	tcgacgaacc	gccacacctg	gccgtccagc	16320
tccaccagcg	agtccaccgg	gtccaccgtg	gtgcccgcga	cgtcgtgcac	caccgaccgc	16380
tcttccccgg	tcagcttggt	cagcaggctc	gacttgccca	cgttcggctt	gccgaccaat	16440
gccaccgcgc	gcggcccacc	ggtcgcgcgc	aagatctcgc	gcggcgtctc	cgggaacacc	16500
tccaggacgg	cgtccagcag	gtcacccgga	ccgcgcgcgt	gcaacgcgct	gaccggcatc	16560
ggctcgccca	accccagcga	ccacagcgaa	tgcacgtcgg	agacgcctcg	ctggtcgtcg	16620
accttggttg	cggccagcag	caccggacgc	ttggaccgcc	gcagcaccct	ggccacggct	16680
tcctcggctc	cgggtggcacc	gaccggggcg	tccaccacga	gcagcaccgc	atcggcgggtg	16740
tgcattggcca	gttcgcgctg	cgcggccacc	gacgcctgca	gtcccttcgc	gtccggctcc	16800
cagccaccgg	tgtcgaccac	cgtgaagcgg	cgcgcgttcc	acaacgcgct	gtaggccacc	16860
cgatcccggg	tgacaccagg	ggtgtcctgc	acgacggctt	cccgcgggcc	cagcagccgg	16920
ttcaccagcg	tcgacttgcc	cacgttggga	cggccgacca	cggccagcac	cggctgcggc	16980
ttcgtcggct	cctcgccctc	gaccgcttcg	acctcgtcga	actcagccca	ctcagcctcg	17040
tcggaccacg	tgccgtccag	gccttccacc	gactcgtcgg	tcacgctcgt	ttccctctcg	17100
aatagtcttg	gctctgggtc	gcgaccagcc	gatccagctc	ggcgatcagc	tcgaccagtt	17160
cgggtgcgcac	cgcctcggtc	gccacgaacca	gcccggcgcg	gcctttgccc	gccggcagca	17220
cgatcggctc	cccgaacaac	acgtcgatcc	tcggtagcag	cctacggccc	gggccatccg	17280
ggcggcgcg	gccccggcag	gccaccggca	ggatcagcgc	ctccgacgct	cgcgcgaacc	17340

acgccgcacc	gtgctgcgca	ttggtcacat	cgccatcacc	ccgggtgccc	tccgggaaca	17400
ccccgacgag	accaccggcc	cgcagcacc	gcaccgcgc	cagcagcggg	gcgcggtccg	17460
gcgcaccgcg	gcgcaccccg	atctgcccga	tgcggcgag	gaaccagccc	agcgcaccgc	17520
ggaacatctc	ctgcttgatc	aggaacaccg	cgtggcgcg	gatcattccg	aacagcagcg	17580
gcccgtccat	catcgaactg	tggttggcca	ccagtaccac	cgggcccgtg	cgcgggatcc	17640
gctccgcgcc	gtggatccgc	acccggtaag	gcagctgcac	gatccggcgc	gaaatccact	17700
ggccgcaccg	gtgcattcca	ccggacgcgc	cctcgggcag	ggtctcgtcg	ctcatggcgt	17760
cgtccgctcc	gccgcgacca	gcaggccacg	gcactccacg	tgcttgcgca	actgcgtgag	17820
cacctccacc	acaccagggt	ccgtgggtgc	gagctccacc	gcgtcgtcgg	ccttgccgag	17880
cggcgccacc	ttccgccccg	agtccagcgc	atcgcggcgc	tgcacgtccg	cgtgggtccg	17940
gtccagggtca	ccggcccgtc	cctcggagac	gtcctgcgcc	gtgcggcgct	gcgcgcgggc	18000
gtgcgcggac	gccgtcaggt	agaccttcaa	acccgcattc	ggggccacca	cggtgccgat	18060
gtcgcgtccc	tcgacgacca	tgcgcctgg	cgacaccagc	gcctcaccga	tcagcttccg	18120
ctgggtggcg	accaactgct	ccgcacctc	ggcgaccgcc	gacaccgcgc	acaccgcgcc	18180
ggtcacctcc	ggcccgcgga	tctcccgcgc	cacgtccgag	ccgtccagga	agatctcagg	18240
gccctccgga	tcggtgccc	ccgtcagccg	cgtcgcgcgc	accacgcctg	ccactgcggc	18300
cggatccgac	gggtcgacct	cggcgcgag	caccgccagc	gtcacggcgc	ggtacatcgc	18360
tccggtgtcg	aggtaggtag	cccccaatgc	gaacgccaac	ttgcgggaca	ccgtcgactt	18420
gccggtgccc	gaagggccgt	cgagcgccac	cacaccaagg	agcctggcgt	gtgccacgtg	18480
catgtccttc	ccgagccgga	accgatcggc	ccgacaccgc	gccggaccaa	ccgtccattc	18540
tgcctggtcc	gctcctgccc	atcccattcg	catccagatc	caatccggac	tgcgggacaa	18600
atacgaaggt	tctacgaata	aggtcttggg	tgtggatgta	actgtgacct	ccttgccagg	18660
gctcggcacg	cagcaggact	tcaccaccgc	atccggccac	cgcacgcggc	tgatcaccta	18720
ccgggacggc	cgtctcgagc	tgatcgtctc	cgaccacgaa	gaccagaca	aggtggccgc	18780
ctcggtcgcc	ttgaccacct	ccgagaccag	cacgttgccc	aacctgctgg	gcgccccgca	18840
gctcgtcgcc	agcagcacag	cgaggtcgcc	cggaaccttc	gggacacca	cctggcagct	18900
gtccgtcgcc	ccgggtcccc	cctacgcggc	ccgaaccttc	ggcgacacgg	agatgcgcac	18960
ccgcacctcc	gtgtcgatcg	tgcgggtcgt	ccgggacggc	accgtgcacc	cctcaccgcg	19020
gccggacttc	cagttctccg	ccggcgacct	ggtggtggtc	gtgggcaccg	cgaaggggct	19080
acgcgcagcc	agcgaatcc	tggaaaagg	ctgatccggc	ccgtcccga	cactttcccg	19140
gccacctgac	ccggacacgc	gtcaccaacg	gcggtccagc	gcgtgccgat	cccctaacaa	19200
ctccatacgc	agggcacacg	cgagaggaaa	cacgttgcaa	gacacggcga	tctcccta	19260
agaactgggt	gcggttttct	tccgtctggg	catcctcggg	agactcgcat	ggaaaatcgg	19320
ggtgtcaccg	atcccgtctc	acctgatcgg	cgggctggcc	ttcggcaccg	gtggcctggt	19380
ccccctgcac	ggcatcgaa	cgttcaccca	cctcgcctcc	gagatcggcg	tggctcctgct	19440
gttgttgctg	ttaggcctgg	aatactccgc	gggtgaactc	gtcacccggt	tacgccgctc	19500
ctggctggcc	ggtgtcatag	acatcgtgct	gaacgcggta	cccggtgcgc	tgggtggcct	19560
gctgctgggt	tggggctccg	tccggcgctt	cacaatggcc	ggcgtcacct	acatctcttc	19620
ctccggcatc	atcgcgaagg	tgtcggaga	cctgggtcgg	ctcggcaacc	gggaaacgcc	19680
ggtgatcctg	tcgatcctgg	tcttcgaaga	cctggcgatg	gccgtctacc	tgccgatcct	19740
gaccgccgtg	ctggccgggg	tcagcttctc	cggcggactg	accgcggtcg	gggtgtcgtc	19800
ggtcgtgatc	accctgggtc	tgggtggtcg	gctgcgcttc	ggcaagtacg	tgtccgcgct	19860
ggtcgacagc	cccgaaccgc	aggtcttctc	ctgcgcctcg	ctgggggcgg	cgtgctcgtc	19920
cgcggggatc	gcctcggagc	tgcaggtctc	ggcggcggtc	ggctcgttcc	tgtgggcat	19980
cgcgatctcc	gggtcgaccg	cggcgaaacg	gacccgcgat	ctggagccgc	tgcgcgacct	20040
gttcgcgcgc	ctgttcttcc	tctgttccgc	cctcaacacc	gatccgagcc	agatcccgc	20100
ggtgctgccg	gtggcgctgc	tgtggcggt	ggcgacctgc	gcgacgaaag	tgctcaccgc	20160
ctggttcgcc	gcccggatgc	aggggtgtcg	ccggatgggt	cggctgcggg	ccggtgccgc	20220
gctggtggcg	cgcggcgaat	tctccatcgt	gatcgcgggg	ctggccgtcg	cctccggcgc	20280
ggtgccgggc	gagctcgccg	ccctcgccac	cgcctacgtg	ctgctgatgg	cgatcgtcgg	20340
cccggtcgcg	gcccgcgtcg	tcgagccgg	ggcccgatg	ttcctcccca	gccaggcgaa	20400
gaaggcctga	ccggaagc	ctccggctgt	cccgaagcga	cgggcccggg	gctttctcaa	20460
cgctgcggat	aacgcgggcg	ggtctggcaa	acgcaacacc	ggtgcgcgaa	cagcctcaga	20520
ggcccactgc	gcggtagagc	gagccgatct	cctggcggtt	caacggccgg	atcgcgcgcc	20580
ggcgtcgtt	ggtcagccgc	acatcgccga	tccgcgtccg	caccaggcgc	tgcaccgggt	20640
agccgacgtg	cttgagcagc	cgcgcacga	tgcggttgcg	gccctcgtgc	aacacgatct	20700
ccaccagcga	ccggttctgg	ttcatgtcga	ccagcttgaa	ccggtccacc	ttcaccagac	20760

cgctcctccag	ctccacgccc	tcgcgcagct	gctgcccag	gtccttcggg	atcgacccca	20820
gcacctccgc	caggtacgtc	ttgcgcacct	tgtacgacgg	gtgcatcagc	cggtttcgcca	20880
gctcgcgctc	gttggtgatc	agcagcaggc	cctcgggtgc	ctgggtccagc	cgccccacgt	20940
ggaacagctt	gccccccgt	ccccgcaggt	aatcacccgat	gcacggacgc	cccttgctcgt	21000
ccgacatggt	gcacaggatg	ccgcgcggct	tgttcagcag	caggtgcgtc	agatcgctcgt	21060
tgaccatcac	ccggttgccg	tccacgtgga	ccaccgcggg	cgtcgggtcg	acccggcgcc	21120
ccagctcggg	gacgacctcg	ccgtcgacct	cgatccgccc	ctcgacgac	atctcctcgg	21180
ccgcgcgccc	cgaggccacc	ccggcctggg	acaacacttt	ctgcagccgc	acgccttcgg	21240
aatcggcagt	gctgctgtac	ggggaacggg	gctcagacgt	catcaatcga	atccacttcg	21300
ggcaacaagg	gggcgagcgg	cggcaactcc	ttcaacgacg	acagcccag	ccgctccagg	21360
aacagctcgg	tcgtgcagta	caggatgccg	cccgtctccg	ggtcgggttc	ggcctcttcg	21420
ataaggccgc	gccccaccag	ggtacggatg	acgccgtcga	cgttcacacc	ccgtactgcc	21480
gcgacccgcg	aacgcgtcac	cggtgcgcgg	tacgcgatca	ccgcgagggg	ctccagcgcg	21540
gcacgcgtca	gcttcgaacg	ctgcccgtcc	aacaggatacc	gctccacgta	cggggcggtac	21600
ttctcccgcg	tgtagaaccg	ccagccgtcg	ccgacccgcc	gcaggtcaac	gccccgttcc	21660
gcctcggcgt	agccgtccga	gagccgcgcg	agcgcggacc	ggatccgggc	caccggctgc	21720
tccaggggtg	cggccagcag	ctcctcgccg	gccggcacgt	cgaccacgag	cagcaacgcc	21780
tccagcgccg	catccagcgc	cgaatcggag	gtcaggtccg	gcgcactcgg	cgcctccacc	21840
gcctcggaat	ccccagcggc	cgccgacggc	tccaacgggt	cctgcggctc	agcgggcggc	21900
ggggtcggcg	actcctccgc	gacctcgccc	gcggcctccg	gctccagctc	cgtcaccctg	21960
actcctcttc	ttcatggctg	gcgcgctgcg	cctcggtctc	ggcctccgcc	tgcgccacgc	22020
tgcgcccac	ccagctcacg	atcagctcac	ccagcggggg	ctcctgctcg	aacagcagga	22080
ccttctcccg	gtagagctcg	agcagcgcca	ggaaccgcgc	caccacctcg	acggtgtgcc	22140
cgcagtcgga	caccagctcc	gagaacgtcg	cgtgcccctt	ctccgccaac	cgcacccgca	22200
gcagcgccgc	gtgctcgcgc	accgaaacgc	cgtgctgggtg	gatgtggtcc	agcgaacggg	22260
tcggcggttg	cttcggcgcg	aacaccgcgc	ccgcgatctc	ggcgaaccgc	tgcggcgga	22320
ccccgatcac	cacttccggc	agcaggttcg	cgaaccgctc	ctcgaccgac	accgaacgcg	22380
gatagcgccg	cagcgccccg	gcctccaact	gcgcgaacag	cgcggccacc	tgcttgtacg	22440
cgcggtactg	cagcagccgc	gcgaagagca	ggtcgcgggc	ctccagcagc	gccaggtccg	22500
cctcgtcttc	gacctccgcg	gccggcagca	gccgggcgcg	cttcaggtct	aacagcgtcg	22560
cggcgaccac	caggaactcg	gtgggttctg	tcaggtccca	ccgctcgccg	agcgccttgg	22620
tgtaggcgat	gaactcgtcg	gtgaccttgt	gcagcgctac	ttcggtaacg	tccagctggg	22680
gctgcgagat	cagctgcagc	agcaggtcga	aggggccttc	gaagtgttcc	agccgcaccg	22740
tgaaccggcc	gcctgcggcg	ggatcctcgc	tcgactgcgc	cgccgggtacc	gcgggggtctg	22800
tactctccg	ggctcctgca	ggcgccgcac	cagcaccgag	tccgcgcctg	tcttgtcgag	22860
gtcggcgagc	accacggcaa	ccgcttcgcg	caccacgcgg	cctcgggtcca	cggcgatgcc	22920
gtggtcggcc	cgcaatgcc	gccgcgcctg	ctccaagccc	agcaactcct	cgtcggacac	22980
gtacacgggtg	atcttcgaat	cgtgcttgcg	ccgtccagag	ccgccccggc	ccgccgcggg	23040
tgcgcctgc	tccgggtccg	gcggattcgc	gtgatccgtc	cgaggaacag	tagtacggaa	23100
caattcggcc	gctcggggca	gggcgacccg	acgcgtcatc	gggcgatcac	ctcgcgcgcc	23160
agtgcgcggg	acgcctgcgc	ccggcccgag	cggggcgccc	agcgggtgat	cggctcgccg	23220
gccaccgtgg	tctccggaaa	ccgcaccgtg	cggttgatca	ccgcacgaa	gacgatgtcg	23280
ccgaacgcct	cgacgacgcg	cgccatcacc	tcgcgcgagt	gcagcgtgcg	cgggtcgaac	23340
atggtcgcca	ggatgccgct	gatctccagc	ctcgggttca	gccgctcccg	caccttctcg	23400
atgggtgtcga	tcagcagcgc	caccccgcg	aggctgaaga	actcgcactc	cagcgggatt	23460
atcacggcgt	ccgcggcgcc	caacgcgttc	accgtcagca	gccccagcga	cggctggcag	23520
tccaccagca	cgtagtcgta	ctccgccagc	gccgggtgca	gcacccgggtg	cagcgtctgc	23580
tcccgcccca	cctccgcgac	cagctgcacc	tcggccgcgg	acaggtcgat	gttgctgggc	23640
agcaggtcca	tgccttcgac	ggtggtctgc	cgcaccacgt	catggatggc	gaccggccgt	23700
tccatgatca	cgttgtagat	ggtctggtcg	agctggtgcg	gctggacccc	gaggccgacc	23760
gagagcgcg	cctgcggatc	gaaatccacc	agcagcacc	ggcgcccgt	ttccgccagc	23820
gctgcgcgga	ggttgatcgt	cgacgtgggc	ttcccgacgc	cgcccttctg	gttgacatc	23880
gcgagcaccg	atgcgggacc	gtgccgggtc	agcagcggcg	gctcggggat	gtgccgacgt	23940
ggccggccag	tgggaccgag	gccgcggggg	ttcggcgcca	ggccgacctc	ctcctcgcg	24000
cccgcgctct	cccgggcgat	gctcaggtcg	accgcgcccc	gggaccgccc	ttcggcggcg	24060
ggctgcggca	gcgacatggc	gatctgactc	cttttggtgc	cgggtggcgat	caaacgcagc	24120
ctaagtggca	ttcgttacca	gcggcaacgc	gcctcgccgt	ggtgtcggaa	gttcctctgtg	24180

atctgcgtgt	gatcaacgtc	taccgcgtac	accaccccct	cgcattcgca	gcgtcaccaa	24240
gtcactccgt	agcgtgtgcg	cgcggtatgcg	tgcgtcgcgta	gacctcccgc	agcgtgttca	24300
ccgtgatcaa	ggtgtagacc	tgggtcgctcg	tgaccgagggc	gtggcccage	agtccctgca	24360
ccacgcggac	atccgcgcgc	ccctccacaa	ggtgcgtggc	gaacgaatgc	cgcagcacgt	24420
gcggcgaaac	cgagccgttg	atcccggcgc	gctgcgcggc	ggtcttcaac	gcgttccacg	24480
agctctgccg	ggaaagccgg	gtaccgcgcg	aattcaggaa	caccgcggca	ctaccccgc	24540
cgcgcgccgc	caggccgggc	ctggcccgtg	ccaggtacgc	gtccagcgcc	gccagcgccg	24600
gtcggccgat	gggcaccagc	cgctggcggc	cgcccttccc	ttccagcagc	acggtcgggt	24660
tggtgccgtc	gatgtcgtcg	aggccaacc	cgaccgcttc	ggagatccgc	gctcccgctg	24720
aatacagcac	ttccagcagc	gcccggctcc	gcaggccccg	ggcatcctcg	cccccggcgt	24780
gatcgagcag	cttcccgcag	tcgcccgtgg	aaagcgctt	cggcagccgc	ttcggcgggc	24840
tcggcggcgc	gacatcgcg	gctacgtcga	ccggcagcag	ccccctggcg	tcgcggaagc	24900
ggtgcaggcc	gcggggcgcc	accaaagctc	gggcccagca	cgacggcgcc	agcgcggggc	24960
gctgcccggg	gccttcccgc	agctccgcca	agaacccgga	cagggtgctc	gaacgcacct	25020
cgccgagccc	agaaatccct	gccgcgacca	ggaattcggc	ataccggcgc	aggtccctgg	25080
cgtaggagtc	gagagtgtcg	cgggcggtac	cgcgctcgac	ggcaagggtg	tcgagggtacc	25140
cggtgatcgc	cccgcgcagg	tcgggcggca	gctcctcgaa	acccctcacc	gggcggcgaa	25200
gcgctggggc	cggtccggcc	attcggcatc	cgcggggcga	ggctccaccc	ggccctcgcg	25260
gaccgcgtgg	gcggcgagca	gccccgccac	cccggggccg	ttgacgatct	ccccggccag	25320
cgccatccgc	accgcctcgg	cgagcgggaa	gcggcggtac			25360

<210> 4

<211> 45624

<212> DNA

<213> *Saccharopolyspora spinosa*

<400> 4

tcagccgacc	ggcttccgcg	ccgtcagaat	cgcatagcc	atgtcgtggg	catattttctc	60
ataatcgcag	accgcggcgg	cccagccggc	gacagccggc	ccgtacctgt	ccgcgatccc	120
gtgctggtgc	gcagcgagct	cttcggcgaa	ctgcggcatg	aagtaccggg	tcctcgacga	180
cacgtcctcc	caatcgagga	tctcgaaccc	cgctgcacgc	agcgattcca	gaagttgtctc	240
agccaggcag	atccgaaggc	cggtcggcca	cctgtccccg	gacaccggca	tcccgcgcgc	300
cgcttctcgt	ttgacgacct	cggtgacgcc	gaggatgcca	ccgggtttga	gtactcgaag	360
gatttcccgg	atggcacggg	ccggttcgga	catctccaac	agcgactgca	tggcccaggc	420
ggcgctgaaa	gcattgtccg	ggtacggcag	ggacatggca	tcgacgcacg	agaagtccac	480
ccggtggctt	agtccgcggt	cgcgtgcgca	atcagcggcg	atggccactt	gcacctggt	540
gacggtgatg	ccggtgatct	ggatcgcggt	gtcgcgcgcg	acgcgcagcg	ctggttgtcc	600
ggtaccgcac	cccacatcga	gcagtcgaac	gccgccatcg	agcacggtec	gttcggcgac	660
aaggctcggg	agccggctcg	cggcctgctg	ccaggaagcc	cgcccgctcg	tctcccagta	720
gccgtggtgg	atggcgcagg	ggccgcccgc	gaccgagttc	agcaacggcg	tgaccaggtc	780
atacatctgc	ccaacctgct	gcgatgttgg	tgcgccacct	ggcaacaccg	gtatgcctga	840
tctctgcaac	gttcaccttc	tcgtaatttt	ctggaaccga	gcaggaaaca	cacagagaga	900
aaagacggca	aactagccgt	cagttaattc	gcggttaccg	ccgcatgcgg	cggtaccgac	960
tataactatc	cggccaggag	gcaaacagcc	agcgcaaatc	ttccccatga	atccccgcag	1020
aaccaacggt	gatcaccgta	caggctccggc	ccaccccgat	cgagcggagc	tcgcgcattt	1080
cactcgttcg	cgtgaaacca	ggtgcggcga	cccaaagatc	ttcgatggtc	gcgtgacatt	1140
cctgccgtga	cacactattg	ttgccgcggg	aagtcggttg	gacgtcaacg	gcgatcgaca	1200
tacgcagcgc	attttccaaa	tcttgcccaa	tgggagtagg	ggctgctgcg	ctaactcggg	1260
gaaagagact	ggggtccgaa	gtatgcgcgt	actcgtcggt	cccttgccct	atccgacgca	1320
tctcatggca	atggtgccgc	tgtgctgggc	gctgcaagca	tcggggcacg	aggtcctgat	1380
cgccgcacca	ccagagctgc	aggcgaccgc	gcatggtgca	ggtctcacca	cggccgggat	1440
ccgcgggaac	gacaggaccg	gcgatacggg	tggaaaccacg	cagctgcgct	ttcccaatcc	1500
ggcggttcggt	cagcgcgaca	ccgaggcagg	ccggcaactg	tgggagcaga	ccgcgtccaa	1560
tgtcgcgcaa	agctcgctcg	atcagctccc	cgaatacctt	cgactggccg	aggcctggcg	1620
accgtcagtg	ctggttggtcg	acgtctgcgc	gctgatcggc	cgggtgctcg	gcggattgct	1680
cgacctgccg	gtcgtgctgc	accgctgggg	agtcgacccc	accgcaggcc	ccttcagcga	1740

tcgagccac	gagttgcttg	acccggtgtg	cgggcaccac	ggactgaccg	gcctgcccac	1800
ccccgagctc	atcctcgatc	cctgtccgcc	gagcctgcaa	gcaagcgacg	cgccgcaagg	1860
cgcaccggtc	cagtacgtgc	cgtacaacgg	aagcggcgca	ttcccggcat	ggggcgcggc	1920
gcgcacctca	gcacggcggg	tctgcatctg	catgggcccgc	atggtgctga	acgccaccgg	1980
gcgggtcccg	ctgctgcgcg	cagtagcggc	tgccaccgag	ttgcccggcg	tcgaggccgt	2040
gatcgccgtt	ccccccgagc	accgggcact	tctcaccgac	ctacccgaca	acgcccggat	2100
cgccgaatcg	gtcccgtctc	acctgttcct	gcgtacctgc	gagctggtca	tctgcgcggg	2160
cggctcggga	acggcattca	cgcgcacccg	actcggcatc	cgcgaactcg	tgcttcccca	2220
gtacttcgac	cagttcgact	acgcgcgcaa	cctcgccgct	gccggggcgg	gcatctgctt	2280
gccggatgag	caggcccgag	cgcaccacga	acagttcacc	gactcaatcg	caacggtgct	2340
cggcgacacc	ggcttcgctg	ctgcggcaat	caaactcagc	gacgagatca	cggccatgcc	2400
ccatcccgcc	gcgctgggtg	ggacgctgga	gaacactgcg	gccatccgtg	cctgatgaac	2460
tagtcacccg	agaacagctg	gatccggaga	accgatgccc	tcacagaacg	cgctgtacct	2520
ggacctgtct	aagaaggtac	tcaccaaacac	gatttacagt	gatcggccgc	atccgaacgc	2580
ctggcaggac	aacaccgact	acaggcaggc	cgctcggggc	aaaggcacgg	actggccaac	2640
tgctcgcgac	acgatgatcg	gtctggagcg	gctggacaac	ctccagcact	gcgtggaagc	2700
cgtgctcgca	gacggtgttc	ccggggatth	cgcgagacc	ggtgtctggc	ggggcgcgcg	2760
atgcatcttc	atgcgcgcgg	ttctccaggc	attcggagat	accggacgta	ccgtctgggt	2820
agtggattcc	ttccagggaa	tgccggaaag	ctctgcgcaa	gaccaccaag	cggaccaggc	2880
tatggcgctg	cacgagtaca	acgacgtgct	tggcgtatcg	cttgagaccg	tcgggcagaa	2940
cttcgcccgc	tacgggctgc	tcgacgaaca	ggtcaggttc	ctccccggct	ggttcgggga	3000
caccttgccc	accgccccca	tcagggaact	cgcctgtgta	cgactcgacg	gcgacctcta	3060
cgaatccaca	atggactcat	tgcggaacct	gtaccggaag	ctctcgccgg	gcggattcgt	3120
catcatcgac	gactatthtc	tgccgtcctg	ccaggacgcg	gtgaaggggt	tcgcgcggga	3180
actcgggata	acggaaccca	tcacgacatc	cgacggcacg	ggcgccactc	ggcgccgcag	3240
ctggtgtaac	gctcagcgtg	cctcgacgcc	gagcgcttgc	cggggcacga	accccgcgcg	3300
ggcaggctca	gcgttgagcc	ctttctccac	gaataccagg	ttgtggtaga	agtgcagggc	3360
cgcacgttcc	cgttccgtgt	aggagggtcc	ggtcccgcac	cgcgattcgc	gctcctgata	3420
atgcaggccg	tcgatcagtt	ctttgagcat	gtcgatcgag	gtgcgctggg	ccgcgggttc	3480
cccatcgcca	ccgcctgagc	cgggccagta	cgcctgtctg	agatcctcga	tgacgtacaa	3540
accacctggg	cggacgtgcg	gaaacaggga	ttggaaggat	ttcttgacgt	ggtcgttgac	3600
atggctgccg	tcgtcgatga	caatgtcgaa	cggcccgcac	ttccccgcca	tgtcttccag	3660
gaattccgca	tcgctctggg	cacctcgagc	ctttcgcact	cgggtgccctt	cgttcccggc	3720
tttctcgaaa	atgtccagcc	cgtaaacgag	acctcgccgg	aagtaccgct	gccacatgcg	3780
cagcgaagca	ccaccgagtt	cgggtgcgtg	ataaccaccg	attcctatth	ccaacactcg	3840
caccggggca	tcctggaatc	gggagaagtg	gtgctcgtag	tgttcgggtg	accagtgcag	3900
gtccgcccac	ttgtcggatc	cgtagcggac	tgccagcgca	ccgaggtccg	cgcgcctggt	3960
ggcggtgcg	gccagcacgg	cgtgcaccgc	ggtggacacc	ctgttccgga	acgccagcag	4020
gcgctgcgcg	ccggcgaggc	cctggtcggg	cgagaactgc	gtcatgctgt	ccgaccagcg	4080
gacttcacgg	ctggtgtgcc	gcctgcgctc	aaccgggccc	aagagccctt	ccagcagatc	4140
caccgcgtcg	aaccggagaa	cagcagctgc	ttcggcgacc	gccgcgagcc	gcaggcctgc	4200
gtgatcgagc	tcaacggttc	tcgggaccag	ctgagcgcca	gaagtgatct	ccaggccgat	4260
tcgcaccgac	tcgtccaacg	acagcggatc	gcagcgtacg	acgagttcgt	cgacgatggc	4320
gtcggccacc	gcgtccagtc	cggccacctg	cactgcttcc	tggagcttcg	ccgggcccgc	4380
accgcgcg	agcagcaaac	gctccaccac	cgaccagggg	gcaactgcga	tctcactcat	4440
ggaaagtcat	cacctthtcg	gttccagcgc	atacggcacc	atgcgcaccg	cgatatcgat	4500
ccacaaagta	gagccggcgg	aggcgaccgg	gtttcacgta	tgagctgaaa	cacacagata	4560
atccccggga	cgcgtagatg	atctcggctg	cgggcgaaca	aagtggacca	gtcagaaaag	4620
gaggggagggt	gcccgaatth	catgaccggg	cacccatgaa	tcgtcgaacc	ccaggaaacag	4680
agatcacccg	cgagcccagc	gatcctcgth	atccggacct	cgtcgtcggg	cacaaccccc	4740
gtttcacccg	aaaacccgaa	cgcattccaca	tcgccagctc	cgcgcgaagc	gtcgtgcacg	4800
ccgtcgcgga	cgcctgtgcg	accggcaggc	gggtaggggt	ccgcagcggc	gggcactgct	4860
tcgagaatct	cgttgcggac	ccggcgatcc	gagtgctcgt	cgacctctcc	gagctcaacc	4920
gcgtgtacta	cgacagcacg	cgcggggcat	tcgcgatcga	ggcgggcgcc	gccctcgggc	4980
aggtgtaccg	aacctgttcc	agaactggg	gcgtgacgat	cccgaaccgg	gcatgtcccg	5040
gggtgggcgc	aggcgggcac	atcctcggcg	ggggatacgg	ccgcgtgtcg	cgcgatttcg	5100
gttcgggtcgt	cgactacctt	caaggcgtcg	aggtcgtcgt	ggtcgaccag	gccgggtgaag	5160

tgcacatcgt	cgaggccgac	cggaactcca	cgggcgcggy	tcacgacttg	tgggtgggcy	5220
acaccggtgg	cgggtggcggc	aacttcggga	tcgtcaccag	gttttggctc	cgaacgccgg	5280
acgtggctag	caccgacgcc	gcagagctcc	tgccacggcc	gcccgcgaca	gtgctgctcc	5340
gatcggtcca	ctggccgtgg	cacgaactga	cagagcagtc	attcgccgtg	ctcctacaga	5400
acttcggcaa	ttggtacgag	cagcacagcg	cgctgaatc	cacgcaactc	gggttggtca	5460
gcacgctcgt	ctgcgcacac	cggcaagctg	gctacgtcac	gctgaacggt	cacctggacg	5520
gcacggatcc	gaacgcggaa	cgcacctggg	ccgaacacct	gtcggcgatc	aacgcccagg	5580
tcggcgtgac	tccagccgaa	gggctgcggg	aaacctgcc	gtggttgca	tcgaccagg	5640
tggccggggc	gatcgccgaa	ggcggcgaa	cgggcatgca	acggaccaag	gtcaaagccg	5700
cctacttgcg	caccgggctg	tccgaagctc	aactagccac	ggtttaccgg	cggctgaccg	5760
tctacggata	cgacaacct	gcggcggcgc	tgttgctgct	cggttacggc	gggtatggcg	5820
atgccgtggc	tccgtcggcc	accgcactcg	ctcagcgcga	ctcggttctc	aaagcgtgt	5880
tcgtcacgaa	ctggtcggag	cccgcgagg	acgagcggca	tctgacctgg	attcgcggtt	5940
tctaccgcga	gatgtacgcc	gaaaccggcg	gagttccggg	gccaggtacc	cgtgtcgacg	6000
gctcctacat	caactaccgc	gacaccgact	tggccgatcc	attgtggaac	acctccggtg	6060
ttgcctggca	cgacctgtac	tacaaagaca	actaccgcg	gctgcagcgg	gccaaagcgc	6120
ggtgggatcc	gcagaacatc	ttccagcacg	gcctgtcgat	caaaccgccg	gcacggcttt	6180
caccgggtca	gccatgagga	gctcatcacg	atgtccacaa	cgcacgagat	cgaaaccgtg	6240
gaacgcata	tcctcgccgc	cggatccagt	gcggcgagcc	tggccgacct	gaccaccgaa	6300
ctcggactcg	ccaggatcgc	accggtgctg	atcgacgaga	tcctcttccg	cgcggaaaccg	6360
gcccccgaca	tcgaacggac	cgaggtcgcg	gtccagatca	cccaccgagg	cgagaccgtt	6420
gacttcgtcc	tgacgctaca	gtccgggtgag	ctgatcaagg	ccgagcaacg	accggtcgga	6480
gacgtcccgc	tgcggatcgg	ttacgagctc	accgatctca	tcgccgagtt	gttcggccca	6540
ggagctccca	gggccgtcgg	cgcggcgagc	accaacttcc	tccgaaccac	cacatccggt	6600
tcgataccgg	gtccgtcgga	actgtccgat	ggcttccagg	ccatctccgc	agtggctgcc	6660
ggctgacggc	accgacgtcc	cgacctcaac	ttgctcgcct	cccactaccg	cacggacaag	6720
tggggcgggc	tgcactgggt	caccccgcta	tacgagcgac	acctcggcga	gttccgtgat	6780
cgcgggtg	gcatacctgga	gatcggtgtc	gggtggtaca	acttcgacgg	tggcggcggc	6840
gaatccctga	agatgtggaa	gcgctacttc	caccgcggcc	tcgtgttcgg	gatggacgtt	6900
ttcgacaagt	ccttctctga	ccagcagagg	ctctgcaccg	tcgcgcgcga	ccagagcaag	6960
cccgaggagc	tggccgccgt	tgacgacaag	tacggaccgt	tcgacatcat	catcgacgat	7020
ggcagccaca	tcaacggaca	cgtgcgcaca	tccttgga	cgtgttccc	ccggttgccg	7080
agcgggtggc	tatacgtgat	cgaggatctg	tggacgacct	atgctcccgg	attcgggcgg	7140
caggcgagct	gcccggccgc	accgggcacc	acggtcagcc	tgctcaagaa	cctgttgga	7200
ggcgttcagc	acgaggagca	gccgcagtcg	ggctcgtacg	agccgagcta	cctggaacgc	7260
aatttggtcg	gcctccacac	ctaccacaac	atcgcgcttc	tggagaaagg	cgtcaacgcc	7320
gaaggcgggc	ttcctgcttg	ggtgccaagg	agtctggacg	acatattgca	cctggccgac	7380
gtgaacagcg	cggaggacga	gtgaacagca	gaggggcgaa	cacacaggca	tttccgaccg	7440
cggatcaggt	ggagtccatc	ttcgatgcgt	tggcgcacgg	gcgtcccctg	caccacgggt	7500
actgggcggg	cgggtatcgg	gaggatgccg	gtgccacacc	gtggtcggat	gctgccgacc	7560
aactgaccga	cctgttcatc	gacaaggccg	cgtctcgtcc	cggagcgcac	ctgttcgacc	7620
tgggctgcgg	caatgggcag	cccgtagtcc	gtgcggcatg	cgcagcggc	gttcgagtc	7680
ccggaatcac	cgtgaacgcc	cagcatctcg	ccgccgccac	caggctcgcc	aacgagaccg	7740
gactggccgg	cagtcttgag	ttcgatctag	tcgacggcgc	ccagctgccc	taccgggacg	7800
gtttctttca	ggcgcagtcg	gcgatgcagt	ccgtcgtgca	gatcgtggac	caggccgcgg	7860
cgatccgcga	ggtccaccga	atcctggaac	cggcggccg	gttcgtctct	ggagacatca	7920
tactcgggt	tcgactcccg	gaagagtacg	cggcggtttg	gacgggcacg	accgcccata	7980
ccttgaacag	cttcacggcg	ctgggtcagcg	aagccgggtt	cgagattctc	gaagtcaccg	8040
acctcacggc	acagaccagg	tgcattggtc	cctgggtacgt	cgacgagttg	ctccggaaac	8100
tcgatgagct	cgcggcgctc	gagcctgcgg	ctgtcggcac	ctaccagcaa	cgtacttg	8160
gagacatcgc	ggcgaagcac	ggaccgggac	cagcacagct	gatcgccgcg	gttgccggaat	8220
accggaacaa	tccggtattac	gccagaaacg	aggaaagcat	gggtttcatg	ctcctgcagg	8280
ctcgaaagaa	gcagtcctga	tggcctccga	gcacgccagc	ctggtcggcg	acgatctcg	8340
ggcaccgcgg	gatgatccct	tctaccgacc	gccgacgcgg	ctaccgcggg	gtgtcccggg	8400
cacgtctctc	agggcccggc	ccgtctcggc	actgcgcggc	acgggcgaac	ccgtcgcagc	8460
caaggcctgg	caaactctct	accggtccaa	ctccgcctt	ggcatgccga	acgccgtctc	8520
cggcaccgtt	ctggtgcgca	acatcccggt	gccgcgcgaa	gatcgcccca	tcatacttt	8580

cgagtgggc	accacggcc	tcggtagcca	agttgccccg	tcgtacctgc	ttcgaaccgg	8640
aaccgagccg	gagaccgagc	tgatcgccgt	ggccctcgac	cgcggtggg	ccgtggcat	8700
caccgactac	gaaggcctcg	gtactcctgg	aaccacacc	tacaccgtcg	gcagggcgca	8760
gggacacgcc	atgctcgatg	ccgcccgcgc	tgcgcaacgg	ctaccgggct	ccggcctgac	8820
gaccgactgc	ccggtcggca	tctggggcta	tgcgaggggt	gggcaagcgt	cggccttcgc	8880
cggcgaactg	cacccacact	acgcacctga	actgcgaatc	cgcgctgcgg	ccgcaggtgc	8940
ggtgccgatc	gatctgctgg	acatcatcca	ccgaaatgac	ggggtgttca	ccgggcccgg	9000
gctggccggc	ctggtcgggc	atgccgctgc	ctaccccgat	ctgccattcg	acgagcttct	9060
caccgaagcg	ggtcgtaccg	ccgttgatca	agtgcgcgag	ctcggtgcac	cggagctcgt	9120
caccgccttc	ctcgcccgcg	agctgagcga	cttctcgac	acttcgggcc	ttttcgagca	9180
acctcgatgg	cgcgacacga	tggccgaaag	cgtcgcaggt	aggaacgggtg	gcccggtgg	9240
ccccacgctc	gtctaccaca	gcacggacga	cgagatcggt	ccgttcgcat	tcggcgagcg	9300
actccgggac	agctaccgcg	cgccgggtac	gccagtgcgg	tggcatccgc	tctccggatt	9360
ggctcacttt	cccgcgccc	tggccagctc	gcgagtgggt	gtctcgtgg	tcgacgagca	9420
cttctccgag	ccgtccgca	tcagcgggtcc	gcgagatgcc	aggtgagcgg	atggcgggtga	9480
gcctctccag	cggtctccc	gctggcttcc	ggatgcccg	tcaggcttcg	aggcgaacta	9540
ctaccgcgg	atgccggcg	gctatgtgga	cccgcaccga	cgggcctgac	cgatcgctc	9600
caccagcgcg	gcctgctgga	tcatcgattc	gcccgaatct	ccggccaccg	cagggtcgtc	9660
cacgcctgtc	cctgctctga	tgtcgcgtgc	gaaggcggtg	accgccttgc	gaacctgatc	9720
ttccgctggc	aaggacaact	cgtcgacaac	gcccttccgc	tcgattcgga	tcacggcctg	9780
ccactcggcg	ggcggcgtga	acgcccggtc	gacgacgatt	cgcccacgac	tccccacag	9840
ctcgtacgcg	ctgcggtagt	ggtgcacgaa	accgtatccg	aggtgggcaa	cggtgccacc	9900
ttccgattgg	agcagcacgc	tgcccgacaa	gtcgacgccc	ga'tcctggg	cctcgtgca	9960
gcttgcccg	agaaccgtga	gcggaccgag	gagaaagtgc	cgagcggcac	gggcgggata	10020
gacaccgatg	tccagcaacg	ctccgccacc	gagttcgggtg	cgatagcgga	tgtccgtgtc	10080
gggaagcggc	ggaattccga	acacggcggt	gaactcccgg	agctcaccga	tctcccggga	10140
ttgcagcagg	tcgcggacca	cgtcgtgccc	gccgtgggtg	aggaacaggt	aattctccc	10200
cagcagcagg	ttcttccctc	tggccagccc	gaccagcgga	gcggtgtcgg	acgcgctcgt	10260
cgtcagcgg	ttctccgcaa	gcacgtgttt	gtctgcctca	agcgccttgc	cgatccactc	10320
tgcattgatg	ccaggcggca	acggcacgta	gacggcatcg	atgtccggcc	gctccaggag	10380
ccgctggtaa	cccagcacccg	cctcgcattc	gaatcgcgct	gcgaaccggt	cggctttcgc	10440
cggatcacgg	ctcgccaccg	ccaccacctc	tgtttcggcc	acgtcgcaca	tcgcgggcag	10500
catccgtcgc	cacgcgaagg	aagcgcaccc	gagcacaccg	atgcgcaccg	gctttcgcatt	10560
cgagctgggtc	atcgcccaaa	cgccacaaag	ctatgcaggg	aggcgaccaa	gctgcgcgcc	10620
tggatgttca	agaagtgggt	gctccggagc	agctcgccca	actgtcccaa	agtcatccac	10680
cggaaagtgc	tgggaggtcg	tgccgcgaag	tcctcatgca	cctcgatgat	ccggtacctg	10740
ttctgcgcct	ggtagaaccg	accgccttct	tcggacagga	tcgattcgta	ccgcacgggt	10800
tcgggatcgg	cggtagacac	gtcgtccaag	aacggcgggc	agtcgttcga	cggggtgctt	10860
tggtagttgg	ccacactgca	ctggaccgtg	ggagcgattt	ccgcagtcca	cttataacca	10920
gcctccaccc	gagcgtggac	caaaccgtgc	agcactccgc	cgatccgctt	gaccaacagt	10980
gcgatctcac	cttggtctcg	cggttcgatc	atcgggtgcg	tccagctggc	gacctcacga	11040
ttggtcgcgg	acaccgacac	cgcgatcacc	gcgaagtact	tgccgtcctg	gtgggcgatc	11100
tcggtatcgg	tgcgatacca	cttgctgacc	ctgctcagcg	gaacgcgcgt	tgcccgcaag	11160
cggtagcggg	ccttggttc	ctcgaaccaa	ccgaccgcct	cggagatact	cgacgaatcg	11220
atgccgtgcg	agagcgacct	ggccaccgcc	tgtcggaagg	gctcctccga	ggcggtagt	11280
tcgggtccgg	tggcggaatc	gtggaacggg	atgcaagaca	gcaccgtccg	ggtgtccatg	11340
ttgacgatgt	tgtcctgacg	aaggagagcc	agcacctggc	cgagcgtcaa	ccagcagaag	11400
tctggcagga	ctggcacttc	ctcctggact	tccaccacca	tgttccgggt	gcgcttccgg	11460
tagaaccagg	acccctgttc	agactggagc	acgtctacca	gcacgcggcc	gcggccccgc	11520
ccgaggaagt	agtccacata	gggcggaacg	ctgccacgg	gtgcctgcgt	gtagttgctc	11580
cgagttgcct	gaaccgtcgg	cgagagctgc	aggacgttga	cgttgcccg	ttccatcttt	11640
gctgacatga	ggcagtgacg	cacgccgtcg	atctccttga	cgagaatgcc	gaggatacct	11700
acttcagcct	ggttgatgat	cggctgggtgc	cagctgggtg	ccgcgccata	gttggtctcg	11760
acctgcaggc	cttctaccgt	gaagaaccta	ccgtcggcat	gaaccaggtt	ctccgtgctg	11820
gcattgaatt	tccatttcga	caggcggtcg	aacgggatgc	gattgggtctc	gaagctgttc	11880
tcgcccagcc	gacggcgag	ccagcagtg	aactccgtgg	tcggaatcat	gccattgcaa	11940
gcgctcagcg	cagagtcgac	gaaccgccgc	gtgttgttgc	tgccgagcgg	cgcagcagca	12000

cttgectcag	cttcgacaga	actgctcatg	cccaatccct	cactgccgtg	acgatgtgca	12060
cgccggctcc	caggggcgtc	gcggtctggt	ccagcggect	ggcgaggatc	atcgaagcga	12120
tccgcccgtg	aggaccgcga	gcacctcgtc	ctggcggttcg	gtcatgaaga	aatgcccgcc	12180
ggagaagaca	cggacgtcgg	ccacggcctc	ggtgtgctct	cgccaggctt	ccgcctcatc	12240
caaggtgacc	ttcggctcgg	catctaccac	cagcacggtg	atcgggcaac	ccaccttcgc	12300
tectggcgca	cagcggtatg	tctcgaccgc	acggtagtcg	ttgctcagcg	ggcgccacga	12360
tectcgctcg	aaatcggttg	gagcgcaaac	ctctggggag	atcaacaccc	cattggacga	12420
ttctggacaa	gaatctgact	tcgggactcg	cctggcatcg	tcccggtcac	ggcggaatcc	12480
gagtcgacgc	aacagcgatg	aacacctgcc	aaaccccggc	gtccatgttt	ccggccacac	12540
ggtgctcagc	gatggccatg	agactgcccc	gtgcggcggt	tctcacgttc	ggcaactagc	12600
ttttccagac	gtggaacgat	gtcgtgcggg	ctgggacttt	cctcgatttc	acggcggatc	12660
agcgccgcgt	tggcagcgaa	cgacggctcg	tcgagcaggc	gggcccagctg	acctcgcacg	12720
tcgctcttcg	taaacgtcgc	ggggtcgagg	accagaccgg	ctccccgatac	ggctaggagc	12780
tccgccttac	gagattcgtc	ccagaaggtc	ccaggagaga	tcaactgcgg	tacgccgttg	12840
accgtggcgg	tttctcgctg	cgctcgtcgag	ccatgatgga	tgatcactga	acacgactcc	12900
agcagttcgt	tgagcggtag	gtattcgtag	acccggacgt	tcgagggcaa	ctccccatc	12960
tcccgtaact	cgctcgtcaga	caaggtggcg	atcacctcga	cgctcagcct	ggccgcgcgcg	13020
cgcaacaacc	tttccaccat	tgcttggttc	tggtcacttt	gtcccccgta	ctgttcggtc	13080
accctgctca	gccgcgcgtt	ggtcagcccc	cgcgtgatgc	agacgcgcgg	cttcgtcggt	13140
cgttcgcgca	accactccgg	caacaccgcc	ggaccgttgt	acggcacgaa	acgcacgcag	13200
atgtagtcca	agtccacagg	caggcgcatac	caggatggaa	tcgatctat	ggtcgcttgg	13260
cccgtcacga	tctcttcatac	gaacgtggct	ccgaacttgg	cgagcttcgc	tcccagccac	13320
gtcccagcgg	ggtcgacgcg	ctgctcaggc	ggcttcgatt	cctggtattc	gaggaaaccg	13380
gaccgcagcc	accccgacac	atcgagggcg	acgagcatcc	gcacgtgtcg	tgcgccgagc	13440
gctcgcgcca	caactggccc	cgaacacacc	atagcgtccc	acacaacgag	atcaggctgc	13500
catttctcgg	cgaacccccat	gagatcgctc	agcgatcggt	catccacaag	gtggagtgtc	13560
tccacgcgct	ccgtgtctct	gccggagtgt	attgacagca	gctcgtcgaa	gagttccgga	13620
tgccgcccc	tctcgtcgaa	cgagaccccc	ctgccgagaa	cgagttcgtt	cttggccgcg	13680
aaggagatga	ggtcgagctc	gtcgccgacg	ggaaccgcgg	tgagtcctgc	tccggtgacc	13740
atcgacacca	tattcgggca	gatggcgaca	cggacctcgt	gccccgcggc	acgcaacgcc	13800
cacgccaacg	gcaccagggt	gaagaagtgc	gaactcgccg	gcagcggggt	gaacaggaca	13860
cgcatgaact	ctccgatcgc	aattgaacac	ccgggaagca	tgccaagaat	cacagaaatc	13920
tctgatatac	cccgggaaac	gccgctttcg	caagccaaat	cttaggcctt	ccagggtgatg	13980
gtagcgatct	tgacaagcgc	gagcaggtcg	ttcccgctag	cctgggctct	accgagtcgg	14040
gtgtgccggg	tagatcgagg	atttctgagt	caatgagcgc	ttctccttgc	tccgctgtcc	14100
tgatgtccc	caccgcatac	aaccagggca	ggaaggtgta	aggcgccgag	acagcacact	14160
gtcccgcgtg	gacgtcataa	cgcgattcgc	cacgggcatac	gctcatctcc	tgaaggcaag	14220
gcgcgaagac	tgatcgtcgc	ctgcatgcag	agccggaaaa	ccagagcgct	ggggaaagg	14280
cgcgccagag	tgacttcgtg	tgacgacact	tgcgtaccg	ctactgagat	ggtgccggat	14340
gccaaaggac	ggatattggc	atccgtacgc	gattaccacc	gcgaacagga	atccccgacc	14400
ttcgtggctg	gatcgacgcc	gatccggcca	tccggcgccg	tgctcgacga	ggacgaccgg	14460
gtggcactgg	tggaagccgc	gctggagctc	cggatcgccg	cgggcgggaa	tgcacggcga	14520
ttcgagagcg	agttcgcccc	cttcttcggc	ctccgcaagg	ctcatctcgt	caactccggt	14580
tcgtcggcca	atctcctggc	actgagttcg	cttacctccc	ccaaactcgg	cgaggcacga	14640
ctgcggcccc	gcgacgaagt	gatcactgcg	gcggtcggct	tccccacgac	gatcaatccg	14700
gcggtccaaa	acggactcgt	cccggatttc	gtcgacgtgg	aactgggcac	ctacaacgca	14760
acgccagacc	gcatcaaggc	cgccgtcacg	gaacggacgc	gagccatcat	gctggcgcac	14820
accctgggca	accccttcgc	cgctgacgaa	atcgcggaga	tgcgaaaaga	acacgagctg	14880
ttctctgctg	aagacaactg	tgatgcgggtg	ggatccacct	accggggacg	gctgaccgga	14940
accttcggcg	acctgacaac	ggtcagcttc	tatcctgccc	atcacatcac	cagcggcgag	15000
ggtggctgcg	tgttgaccgg	cagcctggaa	ttggctcgca	tcatcgagtc	gctgcgtgac	15060
tggggacggg	attgctggtg	cgagcccggc	gtggacaaca	cctgccgcaa	gaggttcgac	15120
taccacctcg	gtacccttcc	accgggctac	gaccacaagt	acacgtttct	ccacgtcggt	15180
tacaacctca	agaccaccga	cctgcaggcc	gcacttgctc	tgagccagtt	gagcaagatt	15240
tccgcattcg	ggtcggcacg	ccgccgtaac	tggcgacggg	tgcgcgagg	gctgtccggg	15300
ttgccggggc	tgctgctgcc	ggtagccaca	ccgcacagcg	acccgagctg	gttcgggttt	15360
gcgatcacca	tcagtgcgga	cgccgggttc	acccgtgccg	ccctggtgaa	cttcctggaa	15420

tcccgcaaca	tccgcacccg	actgctgttc	ggcggtaaca	tcacccggca	cccggccttc	15480
gagcaggtgc	ggtaccggat	cgccgacgcg	ctcaccaaca	gcgacatcgt	caccgaccga	15540
accttctggy	tccgcgtcta	cccaggcata	acggacaaa	tgatcgacta	cgctcgcgaa	15600
tcaatcgctg	aattcgtggc	caagagttcc	tagcatccag	catggcggca	tctcggagga	15660
tttcagcaac	gtgatcaacc	tgcaccagcc	gatactcggc	accgaagaac	tcgacgcgat	15720
cgcgagggtg	ttcgccctca	actggatcgg	gctcggggcg	cgcacccgga	cgttcgaggc	15780
cgaattcgcc	caccacctgg	gagtggatcc	cgaacaggtc	gtgttcctca	actcggggac	15840
tgcgcgcgtg	ttccttaccg	tgcagggtgt	cgacctcggc	ccaggcgacg	acgtggtact	15900
tccttcgata	agcttcgtgg	cggcggccaa	cgccatcgca	tcctccggtg	cccggccggt	15960
gttctgcgac	gtcgaccccc	ggacggtgaa	ccccacgctg	gatgatgtgg	cgaggggcat	16020
cacgccggcg	accaaggccg	tattgctgct	ccactatgga	ggatcgccgg	gagaagtcac	16080
cgcgatcgcc	gattttctgcc	gtgaaaaggg	cctcatgttc	atcgaggact	ccgcctgcgc	16140
ggtggcatcg	tccgtgcacg	gcaccgcttg	cggaaacctt	ggtgacctgg	ccacgtggag	16200
tttcgatgcy	atgaagatcc	tggtcaccgg	ggatgggggc	atgttctacg	cggcggatcc	16260
ggagctggcg	caccgcgcaa	gacgactcgc	ctaccacggt	cttgagcaga	tgagcggatt	16320
cgattcggcc	aagtcttcca	accgctgggt	ggatattcgc	gtcgaagaca	tcggccagcg	16380
gctgatcggg	aacgacatga	cggcagcgct	tggcagcggt	cagctgcgca	aactgccaga	16440
attcatcaac	aggcgtagag	aaatcgctac	gcagtacgac	cggttgcttt	ccgatgtgcc	16500
gggtgtcctc	ctaccgccga	cgctaccgga	tgggcacgtc	tcgtcacact	acttctactg	16560
ggtccagctg	gctccggaga	tccgcgacca	ggtggcgag	caaatgctgg	aacgcggcat	16620
ctacacgagc	taccgctacc	cgccccctga	caaggctccc	atctaccgcy	cggactgcaa	16680
gctgccttct	gcggagcacg	cctgcgcgag	aacactcctg	ctaccactgc	acccaagcct	16740
tgacgacgcc	gaggtgcgca	cgggtggctga	cgagttccag	aaggccgtcg	aacaccacat	16800
cagccaaaga	tcaccactcc	gaaagtgagg	atgtcgcgcy	tgagcgacac	attcgcagaa	16860
acctcctcgg	tatacagccc	agatcatgcc	gacatctacg	acgcgatcca	ctccgcgcgt	16920
ggccggggcg	ggcgagccga	ggccggggaa	gtagtccagc	tcgtacgcac	cagggtcccc	16980
gaagcacagt	ccctactcga	cgtcgcctgt	gggacggggg	cgcacctaga	gcgattccgt	17040
gccgaatacg	cgaaggctgc	ggggcttgaa	ctgtccgatg	cgatgcggga	gatcgcgatc	17100
agacgagtc	ctgaggtacc	gattcacatc	ggtgacatcc	gcgatttcga	cctcggcgag	17160
ccattcgacg	tcatacactg	cctgtgcttt	accgcggctt	acatgcggac	cgttgacgac	17220
ctgcgacgcy	tgacgcggaa	catggcccgg	cacctggccc	ctggtggagt	cgcggctatc	17280
gaaccctggt	ggtttcccga	caagttcatc	gacgggttcg	tcaccggagc	cgtcgcgcac	17340
cacggcgagc	gggtgatcag	ccggctatcg	cactcggctc	tggagggccg	tacgagccgg	17400
atgaccgtcc	gctacacagt	cgccgaaccc	accgggatcc	gggacttcac	agagttcgaa	17460
atcctctcgc	tgttcactga	ggacgagtag	accgccgcgc	tcgaagacgc	agggatccgc	17520
gcggaatacc	ttcctggagc	accgaacggc	cgaggcctgt	tcgtcggaat	ccgcaactga	17580
gcccggaaaca	acgacgcaag	acctggctgg	gcaggccccg	ggactcactc	gaccgataag	17640
ccgacgtgac	ccgggatcac	ttcgatcgtc	tctgatgccg	gcaagttttg	accgtcgtga	17700
tctaggtgcc	aaccaggctg	acgaagccct	gggccctagc	cgcgatcgtc	ggcaaggctg	17760
ccgaggacga	tcccgcctcg	aatctgcgac	cacctcgccg	cagctgttcc	ggcagacgtt	17820
gtgatccgag	ccgacgagaa	ccactcgggt	cagcccgcca	cctgcggctg	ggaggtgttc	17880
ggctcctgag	cagcccccac	gcaccggcca	tcggcgaaaga	actcgaccgg	ctccgcgcgc	17940
ggatgcgcct	acccgacctc	cgaaaagccg	caccgcctat	gctggcaacc	gcccacgcct	18000
gacctaaagg	gccgggtgagc	cacggctggc	ccagtgtcgc	caggcaaccg	cggcgacacc	18060
gcggtaacgg	cgcccgaagt	acaggttgtc	aatgaccgag	acggcgaagg	ccgacatccg	18120
taccacacag	aacagggtgt	gttcggcgta	cccggctcgca	gcgagcctct	ccgacttcga	18180
ttgcaccatc	gccgactgag	cgctcacca	gggcacattc	ccggcgtcgt	cgaacatgcc	18240
tccggtcggg	ccgtcgtctg	gcagcgtggc	gagccgaatg	gcgatcctgg	caccgtctgc	18300
cggcgtgctg	gttccttgga	agccgttaag	gtcggctcgc	acgtagccgg	ggcaggcggt	18360
gttgattttg	atgttggtat	cgctgagttc	cttggcgtag	tggatggtga	tcgcgttgag	18420
gaacgtcttc	gacgggtgag	aggctccgct	gatcccgcgc	aggtcgacgc	ccggcgtggg	18480
ttgcaaggtc	agggaaagcga	cgtggctgga	ctggttgacg	atccgcgggc	gctcggagcg	18540
gcgtagcaac	ggcagcatag	cgttggtaac	ccgaacgacg	ccgatcacgt	tggctctccac	18600
caccgcccgg	aggctcgccg	gtgtgacggg	cgagggtctc	tccggccatg	ccccggcgat	18660
gccggcggtta	ttaaccagca	catcgagccg	gccggcgcg	tcctcgagca	gagccgcagc	18720
agccgcgacg	ctcgcgtcgt	ctgtcacgtc	cagggatacc	gcgaacgcac	cgacgccgtc	18780
cgcacgcaat	ttcgccacgg	catcctcccc	gcgctgggtg	tcccggtgcc	cgattccgac	18840

gctccacccc	agcgcgccga	gcccggccgc	gatctcgatat	ccgattccct	tgtttgcgcc	18900
ggtgaccagt	gcaatcgtct	gttcgctcat	gctttctagc	gtggcccga	accggcgggg	18960
aaccaacacc	atctaggtct	cacaccgata	cccagctgat	atgaatcagc	ggtaggctcg	19020
acggatggag	acgcgggagt	tgcggtactt	cgttgccagtc	gccgaggagt	tgcacttcgg	19080
ccgggccgcc	cagcgccctgg	gcatcgcccc	gcccgcgctg	tcgcggacga	tcgcccagct	19140
cgagcaacga	ctcggagtcg	tgttgctgca	acgcaccagc	cgcaaagtct	cgctcaccga	19200
agccggggca	atgctgctga	ccgaaggccg	ggcgatcctc	ggcgcgctgg	cagcagccga	19260
gcgacgcacc	cagcgtgccg	cgacgagcca	gcccctcgcta	gtcctggctg	ccaaggccgg	19320
cgcttcgggt	gagctgctgg	cgaagttgct	cgacgcgtac	gccgccgagc	cgggagccgt	19380
ggccgtcgac	ctgctgctct	gcgaatccca	gccccagaaa	acgctgcctg	acggccgggc	19440
cgacgtggcg	ctgttgcatc	aaccttcga	cccgcggccc	gaactcgaca	tcgaaattct	19500
gaacaccgag	caacaagtcg	ccattcttcc	gacctcgcat	ccgcttgcca	gcgagcccca	19560
tgtacggatg	gcggatgtca	gctcactgcc	ggatctcccg	cttgccgctg	ggcccggccc	19620
cgacggcgct	tatccagatg	gccccggcgt	ggaagtacgc	aaccagacgc	aactgttcca	19680
aatgatcgca	ctcgcccgca	ctaccgtggt	catgcccga	tccagtcgcg	tcaacctgct	19740
cgaaggcctc	gccgccgtac	cggttctaga	cgcgcgggac	gtgacgacag	tcctgcctg	19800
gccgccccac	agccgctccc	gagcactcgc	cggcttggtc	cgcgtggcca	cactcctcta	19860
aatcttcgct	ccctcaattg	cccgcagcta	ggacgaatgc	cgtgcgactg	ccggaacga	19920
ccgcgcgcaa	cacctcatgt	gcctcagcgg	gagaagacgc	tatgcggatg	ccgcagagac	19980
ctcacggccg	tcccgtcgcc	aggagccagc	ggtcccgttc	gagctggtag	gtttcggcga	20040
tctgctccgt	gacgcggtcg	atgtagccga	agctggttgc	gagcattcgt	tgcgtggtcg	20100
ctgcggatac	ggcctcgctg	gcgcattggc	ggcggatctc	gtcgaggcat	cactacagga	20160
agcggaagtg	cccgatgcgg	ttggccctga	tcagcgcgtt	gatggaaatg	tttcgccagt	20220
cgtcgcggat	actccaacac	cgcagcagga	cccggcgaat	atcccaacgg	aatctcgaat	20280
tcgagaacgt	gcggcaatgt	ggcgatatct	tcctcaacac	tcgtccgtag	aatgctgagg	20340
acgatctcat	cggctcgcaa	ctgcggagcc	tcggtaatca	ggtgcgtgta	gacgtctcgg	20400
ctgacttcgg	agacgcgcaa	cgcgacgctc	gactgccacg	ccgcctgtag	cttcgaggaa	20460
tcgaagctgt	ccgtggccat	gacacgacgg	tactgcggcg	ggagcagaag	cagcgttcc	20520
tgcgccgatg	gcgcgcctgg	agaagatcag	caccttcggc	ctgaccgagc	cgggcgcacg	20580
gcaccgacgt	ggtccagctg	gagctcggag	acacagcgtg	gcggtgttca	gcgcgccag	20640
gtcccgcagc	cagcgttttg	gcgtgcggcg	cttcgggaga	gctgggcat	tacaggttgt	20700
gcgagagcag	ctggctcagc	acctcgtcga	cgttcattca	ccggtgttca	tcaccagggt	20760
cgaccacgtc	gtaggtgtcg	ttcaagaagt	ccgcaagctg	gtcagcattc	acctcgaagg	20820
aggcctgccc	cgacggcgag	ctcatctcga	tcacgaccaa	ccccggaaaa	ccccgtcgag	20880
ggccgatccg	cacatcgctt	tcgcctgcct	cggcgatcag	cccgtcggcc	agcaggtcgc	20940
gggcgatcac	ccagtccacc	tgaccgtccg	tgcctacgtt	gagcttcatg	gagatctcgt	21000
acggattgcg	gctgtcgtac	cgcagctcca	cgcgcactgg	cgcgatcaca	cccgcggggg	21060
ctaccagggt	gaagatcatg	gtggcgagca	ccgtgccgtg	atcgtttgcc	atgatgtcca	21120
cgctcccaag	ccttggtctt	ccataccctc	ataacgaagc	atgcccaacc	cgggttcata	21180
ccttcttcac	gaagtcttca	gaccttggtg	gcagtcccc	tcgggctccc	agcgaggaa	21240
cttcactcac	actgaacca	cgggactctg	ggcccggaa	tcccgaagct	gacccaaggt	21300
gcaaagcaac	cggcgagtag	cttttcgctg	cgccagtcga	tcaatgacgg	ctccgggaat	21360
gtctcgtgac	catgctaggg	cgtactcgcc	gaaaaatggg	atggatacgg	gctgaccagc	21420
aggaacgcgg	tcagacggtc	tggtcctcgg	gaaagaatcg	ggcgggtttg	tctggcgcg	21480
gcgtcaggac	tgggtccaagg	cccgttcgat	cgcgcggcgg	gcccggccgg	cggccgccc	21540
gtcgtgctgg	agctgcatgg	ccgcgttcag	tgccagccc	gtggcgacga	tctcgaacag	21600
cgcttggtcg	atgtcgaacc	cggcgggcag	ctcgcggttc	tccaccgccg	cggtcaggtc	21660
cgcccgccagc	tgtccccgcc	agcgcgacca	cacctcgccc	accgcgtcgc	ggaccggccc	21720
ggggcgggccg	tcgtactcgg	tgagcgccgc	ggtcatcagg	cagccgccgg	gcagcagtg	21780
cgcttctagg	tagccacagg	cgttggcgca	caccgcgcgc	agccgccgca	gaccggcg	21840
ctcgccagct	gcgggctcga	ccaccgggtg	ccagaagtcc	acgaatgcct	tgtccagcgt	21900
ggagatctgc	agtgtctcct	tggtgccgaa	gtgcttgtgc	accccgact	tgctcatctc	21960
cagttcctcg	gcgagccggc	cgatggtgat	gccgtccagc	ccttcctcgg	atgcgatctc	22020
ggcggcacgg	tcgaggatcc	ggctcctggt	ggcctgtgct	tcggccgctg	agcgtcgcg	22080
tgacatgtga	cgaggatagc	gtacgcgcgt	tcgctattga	tttagtgaac	gtgcgtacgc	22140
taaattccgc	ttcaccacag	gaccgaagga	gtgcgagatg	cgggtgcgac	gactgggctg	22200
ggccggactg	gaaatcgagg	cgggcggcaa	gcgactggtg	atcgactacg	tacgggacct	22260

ctcaccgctg	ttcacggcgt	ggaaaccccg	cgagaggctg	gcggtgccga	gcgggacggt	22320
caccgcgcga	ctggtcaccc	acctgcaccg	ggaccacacc	gacgcggccg	cgctcgcggc	22380
cgcgctgaca	ccgggggcac	cgggtgctccg	acccgcgccc	ggccacggcg	acgacgtgga	22440
caacgtgacg	acactgccgg	ccgagcgcga	gctgacactg	caccgactgg	ctgccgaggt	22500
cgtggatgcc	tggtccaccc	gcgacctcgg	gccgttcgcg	gtcaccgcgg	tccccgcctg	22560
cgacgggctg	ggcgacccgc	agctgaactg	ggtggtgcag	gccgacgggc	agcgggtctt	22620
ccacggcggc	gacacgatgt	tccacggcta	ctggtggctc	atcgcgcgcc	ggttcagccc	22680
gttcgacgcg	gtgttcctgc	ccgccaacgg	cgcggtggtc	gacgcgccac	acctccagcc	22740
gccgagcccc	ctgcccgcgg	cgatggacce	gaggcaggcc	gccgcagccg	cagagatcct	22800
cgacgccccg	tacgcagtgc	cgatgcacta	cgaggcgga	cagccggaca	agatcgcggg	22860
ctacgtcgag	gtctccgacc	cggagaatga	gttcgcgacg	cacgccggac	accgcgcaca	22920
cgtgctgccc	atcgaggaat	ggctggacct	ggccacttga	ggcgaaact	ccgccgcgcc	22980
ggcgggctca	ggtcgcaaca	gaacctaggt	ccgatggatg	gtccggaatc	gcgcgggaat	23040
cggttgctcc	aagacactct	ccggtcgcgg	cggcgtcaat	cacaagattc	agcatccatt	23100
actgctggaa	accacgatca	aatgcgacac	tccgggttga	gccgaaccca	cgggtccagt	23160
cctggtcctg	ggcgggacgg	acccttgggt	tcccgcggag	gaacctcac	ttgcgctgaa	23220
cccacggcgg	ccgaagcgtc	ccggtagcag	acgcgggaaa	ccagcgctta	gctctggaac	23280
gctggctgcg	gaccgggccc	agaggcgagc	gctcggtggg	tgctgagttc	ggggacgtac	23340
ttgtagatcg	tgcagcgga	gacgcaccgc	acgcttgagc	ttgaacggcg	cagcacgcga	23400
cccgcgccag	ataccggtta	gcgtggctag	atcaacactg	cccgttgtgc	accattagcc	23460
gcataatgtc	ggttaccatc	gattcgatgc	ggatccggta	cgtgtcaaag	ctctctacgt	23520
cgacgggtac	ctgaatgccg	cgctcaacga	cgcgtcatcc	gggtcagccc	ttctcgagca	23580
ggcgagcgcg	ctggcgggcg	agttgggcga	ccaatcaggg	gcggcctacg	tcgcgcagat	23640
ctcggggctc	accgcctgtg	tcaacgaaga	tccggcgcgg	gcgagcgcg	tcttcgaaga	23700
cgctctcgcc	aagcatcgcc	tgattggcga	tcacgtgcc	gccgcctacg	atcagatcga	23760
gctcgcgttg	gcagtcgctg	tccttgggtg	tcatgagcgc	gccgctgccc	tggtccgcgg	23820
gtgccctgcc	gtcaaggaga	cctacagcga	acagtggatg	agatcgcttg	ccctgtgggg	23880
gaagggaata	gcagacctac	tagcgggcaa	ttaccggcaa	gccaatgctg	cggaactgga	23940
gagtcttcgc	ctgcggtctg	gcttccatga	gcagtttcag	atcgcgttgt	gcgttgagat	24000
tctggcctgc	atagccagcg	cagacggtga	cccggcacgg	gctgcgacct	tggtcggcgt	24060
gtcccaaacg	atcaaaaaga	acgtcgatgc	gtcgctcgcc	ggccacaaac	atggtgcgcg	24120
cctacacgac	cactacgagg	cagtagcacg	tagctcactc	ggcgacgaga	cgtttcagaa	24180
aggcgttcac	cacgccacac	agctcgactt	cgacgaggcc	atcgcatgga	tacggaatcc	24240
gggcaaagcc	ggggaaccag	caagctccag	gacggaagaa	acgcacgcgt	cgggtgcttac	24300
tccgcgcgag	cgagaggtag	cagcgctggt	cgcacagggc	accaccaaca	aagaaatcgc	24360
cgccatcatg	gtgatctccc	gccgcaccgc	tgaggcccac	gtcgagcaca	tcctgaccaa	24420
actcggttcc	accactcgga	cgcaaatcgc	gacctgggtc	attcaacaga	agaccgcgcg	24480
acgatgcgac	tgacaaccgc	cggttttcgg	attggcggtg	accagtagaa	gctgccccgt	24540
ctgcgagacg	gccccctctc	acagcctctt	ctccacagtc	gatcaacgac	cgaacgggac	24600
cgtttgagga	cggcatccga	tgcccaccgc	gcggagagga	gcacttggcc	atgcgcacac	24660
tgatcgagaa	cgctgccgtg	gtgacgatgg	acgacgttct	cggcgacttc	gaacgagccg	24720
acatcctcgt	cgacaacggt	gtcatcgtcg	agatcgggccc	gaacctcaac	gttggcgaca	24780
ccgagcgaat	cgacgcctcg	tcgatgatcg	ccatgccggg	catggtcgac	acccatcgac	24840
acacctggca	aaccgggctc	cggggcattc	tggcggacgg	gaacatcctc	gactacctga	24900
ggggattccg	gctgcagatg	gcgacgaagt	accgcccgcg	ggacatgtat	gcgggcaact	24960
acctcggtgg	cctcgattgc	cttaactcgg	gggtgaccac	gctggtcgat	tactgccaca	25020
acatcgctcac	cggcgagcac	gcgcacgcgg	cggctcgctgg	actccgcgac	gcgggctgtc	25080
gcgcgctgta	cggccacggc	ctcctgccca	tcacgtcgaa	cacgtggtcc	gagaccaaag	25140
gcgggctgga	cgagtcggtg	gaagaaggcg	acttcgcccg	gcgggcgcgg	ctggcccggg	25200
aaatccgcgc	ccagtacttc	ccgagcgagc	aacaattgct	gcgcttcggc	atcgccccgc	25260
aggaactagc	catcgctccc	ttcggggacg	tcaagcagga	attcgagctg	gcccgcgagc	25320
tcggcgcacg	catcacgttc	cactgcaacc	aagtcatcgc	gcgcaacctg	ttcaaggaca	25380
tcgaggcgct	gcactcccac	aacatgctcg	gcagcgacct	tctcttggtg	cacgggacat	25440
tcagcactga	gaacgaatgg	cacctgctgc	ggggtaccgg	caccatgatc	tcggttttgcg	25500
ccgagaccga	gatgcagatg	ggcatgggat	tcccggtcat	tcgtgaggcc	accgagaaca	25560
cgcgggggcc	aagcctcggc	atcgactgca	cgagcagtac	ctgcggcgac	atgatttcgc	25620
acgcacggct	cgtcctacag	gtgaccgat	ggaggggacga	tcaagaagac	tacgcgcggt	25680

cgacactgcc	cacgggtcatg	cggtggaaaa	cgcgcgacgc	cttacgggtgg	ctcacgggtca	25740
acgggtgccc	cgccgcgggc	gtcgacgacg	tgacaggaac	cctggcaccg	ggcaagcggg	25800
ccgacatcgt	attgctggac	atgtcaggca	tcagccaggc	cggttggaac	cgccacgacc	25860
cttgtggcgc	gatcattgcg	cagaccaact	cgggcaacgt	gcacacgggtg	ctggctcgatg	25920
ggcgggtggt	caagcggaac	ggccggctgg	tgacagtcga	cgtcaacgga	gcgcttgcaa	25980
cgctcgcgga	gtcgcacggg	catctctacg	accaaattggc	ccagcacggc	ggattcatcc	26040
cgaacctcc	agccgagcta	ccgggtgttca	accgctgaga	accaagccag	ctgtggctgg	26100
cgcgccattc	gctgcgtgag	gtgacccggc	tggccgggct	cgaccggaaa	accgtcagac	26160
gctgctgtgt	gacctgcacg	gacgaggtta	tcggcatagg	caaggccagt	cgcagcagca	26220
cggtcgctca	tcattgccgcg	cccaccgtca	gccgcgtgcg	agcgccgatt	cgagcaacca	26280
cgccggggcc	cctggaatag	ccgcttccac	ctgcacggag	caggatttcg	cctcgtggac	26340
cgatgatcgt	ccccgtgaac	gcgtggggct	gccgtgcggg	aacgcgcgt	cttcgggggg	26400
gaaggcgggc	tgccgggaacc	ggcgttgact	gacctcgt	gcgcattcga	gcatcagcgg	26460
ccacatcaat	ggggaggggc	cggtgacgac	aaagaccgtc	aggtgtggtg	gcaggacgcg	26520
gtccgaacgc	accgtgaccg	ttgaacggtc	ggccgagctg	tcgtttcttg	ccgcagcaac	26580
agcaactcga	cgaacgcgcc	ggcgatcttg	ccgcgcgggg	gccaccaacc	gcgaactcat	26640
gaccgggctc	aacacatcaa	cccagccccg	ataacagggt	tcgagccctg	cctgtcgact	26700
cgtggcaatc	gccctaaagg	agggccagct	gtggttacgg	atcgtgttcg	cgtgtcctt	26760
tgtgaagcgg	gcgtgagtga	gttcatagag	cccgcgccgc	gttcgtgagt	aagttcttga	26820
acatggagaa	cggcgggacc	agccggacag	cgtcgtctac	cgcgtacgcc	cgcgcctatc	26880
accagatcgc	tgaccgacca	cagatcttca	ccgacccccct	ggcggtacgt	ctgctcggcg	26940
tcaccgcaga	ggaactgacc	aaattggcca	cgcccacaac	cgatcacctc	ggcgccgggg	27000
caatcgatca	gccccgcgcg	ctgttcttctg	ccgcccgtgc	ccgcttcgcc	gaggacgcgcg	27060
tggccgcggc	catcgccgat	ggtgtacggc	aggctcgtgat	cctcggcgcg	ggcctggaca	27120
ccttcgccta	tcgcaatccg	cgcccggact	tgcgcgtctt	cgaggctcgac	caccccgcca	27180
cccaagcatg	gaaacgcgaa	cgccttgcta	cgcaggggat	cgaccgccct	gagacgttga	27240
ccttcgtacc	ggtcgatttc	gaaaccagc	cgtcggcaac	tggattggaa	tccgccggat	27300
tcaaaccggac	ggaccgggca	gtattcgtgt	ggctcggcgt	tgtcttctat	ctgaccgcga	27360
acgcgcacca	cgccaccctc	gaatacatcg	ctggtcaagc	ccagccgggtc	gaggtggtct	27420
tcgactacct	gcagcctgcg	gccaccgacg	aggaccgtgc	gcaccagcgg	gcacgtgccg	27480
atcggctggc	cggcgcgggc	gaacccttgt	tcagctactt	cacaaccgac	gacatcgccg	27540
cacagcttca	cgccctcggg	ttcaccggca	tcgaagacca	ctccgccccg	gacctcatcg	27600
ccggctacct	ccacggatcc	gcaggtttcg	agggcgaacc	accccgcgca	ctgcgcgcga	27660
gccgcatact	gcacgcgagc	cgtgagggtt	tgcctgccgc	gcctacttgg	accacatctg	27720
tcgcgacggc	tagcatctcc	cacatcgtcc	tctgaactgc	acaaactcaa	aaaatcgcg	27780
gagcgcacgc	gggtagggcc	ccggcgaaca	agccctagcg	atacatcact	ttgaacaagg	27840
tcgcgtctcg	ataggctgcc	aatgcgcgt	tgcgtttcgc	gcgaaccgcg	cggtcgactt	27900
ggtcgtggcg	tagtcaagga	accgctgcag	ctcatcgcgg	gtgaacgggc	ggtcgtccgg	27960
atcgccctca	taggactgga	gatgggcgag	tgagttccac	tcgtgcacat	tcgccaccgg	28020
gtactcgtcc	ggcccgaacg	acgcctcgca	cgccagcgcc	cagccatacc	ggctgtcaca	28080
gaggaattcg	ttgaacagcc	tgagactgcc	ttggtaggcg	cggatttgtg	atggcgcgag	28140
atgccgttct	ccggtcggtg	attgcgacca	ttcgtccaca	tgcgacgggtg	tccaccgcca	28200
cggatactcg	ttggtgaact	ccgcgaaccg	gcgcaccagc	cgtccccgca	ccccggccag	28260
gtgcgggaac	attgccttga	tcaaaccgca	gtccagacga	tcattgatcaa	cgagtgtgat	28320
caccagcagt	cactggagcc	ggcgttgctg	ccacacgggt	ggccaaccgc	agcaggtggg	28380
tgcacagcaa	cgttggttga	gcacaacgcc	tgactggttc	aggtccggcg	gcagcccgta	28440
ttccagccgt	ctcggcgcg	ggacgttcgt	gttcagagat	aaaatcgtgt	tgcccggttg	28500
gtcggtttgg	gcggttttga	gtccgtgcga	ggccgattat	gcggcatggg	gcctgtgttg	28560
aggaggtgcc	gtggttacta	cgcagcggaa	accggcgggt	gctgggggaa	cgacggtgag	28620
tctgccgggc	gtaacggccg	agttccaccg	tcccgatcac	tacattccca	ctcgtgatga	28680
tcttgctagc	gcggctgagg	ccgttcgggg	cgttctccc	gaccatcaga	cgatggcctt	28740
ctatcgtggt	cttgaggcgc	tgaccctggt	ggggttgatg	gactggccgg	tggcggcgcc	28800
gattggcgtg	ggtgtcgcgg	tcgcgcagcg	tgcggcgga	ccggcgtcga	agtgatccgg	28860
tttgtagcgg	gttcggggct	aggcgtcgct	gagcgcgcgg	cgccggcgct	caggccaggt	28920
gaacctgggt	aggtgttgcg	ttgcctgcgt	ccggcgtagc	tgcatgctcg	gagccgtttc	28980
gaagaacccg	agcacacagg	cggccttgaa	ttcaccaccg	ctgggactac	tgggtgtgtcg	29040
gcgggtcgaa	cagcgtggcg	aagccgtcgg	tgttgctgat	cagctcgcag	gccaccgaga	29100

ggacggatgt	gcggtctgtt	cgaggttcgc	tttccgctcg	tcggctctac	gctcgtgact	29160
cacggtatct	gtgcgcgcgg	gaggtagtg	tggttaggac	ggcgcggaac	acaacgcctg	29220
gcgcaggcgc	gcggcaacaa	ggggcgcggt	tgcgagccgc	ggcggtcagc	ctgcccgtcg	29280
tggcacagtt	tcgtcgggtc	gatgttcgca	tgccgggtcg	ttgggaggac	gcggttcgcg	29340
cggtaacgggt	cggttggggg	ctcgaatggc	cggttgcggg	ggcgaccggc	gcgggggtgt	29400
cacgggcgtc	ggtcggcttt	gcgtcggaca	gctgagtgtg	ttcgatgctg	cgtaccttgg	29460
gcgcgttggc	ctcgcagatc	gtggcgccgg	tggtggctgt	cgcgcagagc	atcgcgggct	29520
tggggcgcgg	gcggcgggcg	tggtcgtcgg	aggggcgtgc	gtacgtcgag	gtgcgcgggtg	29580
ttgaccagcc	gggggctgag	gaggctggcg	agcagatcgc	ccggcggttg	gagaagggtc	29640
cgggtgttgc	gtgggtcgag	atcaacgctg	tcgtggggcg	ggtggtcatc	gggcacgata	29700
cgggcctggt	tggggtcgct	gagctggtgg	gtgtggtgga	ggacgcggag	gcggacaccg	29760
gtttggacga	ggaaccgttc	gctgcgggtc	gtgtgagcca	cccggaacaat	ccggtcaagg	29820
tgatcgctga	ggcgacgggtg	ctgggtgcga	acttgaccgg	cgtctgtgatc	gcggtggggg	29880
cccgatgct	gccgctgccc	gtgctgcgc	cgtctgttcc	ggcgctggtg	tcgaccggtg	29940
agtcggcctc	ctgggtccgg	gggcccgtgg	aaacgcggat	cggaagacc	gccactgacc	30000
tggtgttcgg	gtttagcagt	gcgttgggga	acacgcttgc	gcggcgcccg	gcgagtttgc	30060
tggcggaatc	ggggtaccgg	ttctgcctgt	tgccggagac	gcaggcggcg	cggcggagct	30120
gggcgcgggtg	ggaagccgga	acgggggcgc	atcctgccag	tcaccgtagt	gcgcgggtgg	30180
gggttcggcc	gcgtcctgtg	ccgttgcccg	ccggcccggg	cgagcgcgcc	gcgaacggtt	30240
cggctctggg	tgggccggcg	gcgttcgcgg	gcatgctcgg	ggtgacgcgg	agttttcagc	30300
gtgcgcaggc	gatggtggtc	gcgggcgcgc	cgcgcgcggc	gcagggtgggg	cggggcgcg	30360
tcgcggcgca	gctcgggtac	gggctgtcgg	agcggacgac	tctggtgttc	gatgcccggg	30420
tggtgcggcg	ggttgaccgg	gtcgacacgg	tggtgatcga	cgcggacggt	ctgcgcaccg	30480
gtgctcgggt	ggtgcatgac	gtgattcccg	cggacggggg	gcgcgcgggtc	gtcgagttgt	30540
gggaacgtgc	gcatgaatc	gtgggtgtga	ccaagggggt	cggcgcgcag	cgtgatggtt	30600
ggtcgtgtga	ctcggctcgt	cggtcgcggg	tccccaga	cgtgcgcgag	gtggccgggtc	30660
ggggtatcga	ggtgttcgcg	ctgcgccacg	attcgcgcac	ggccgcgtgg	gttctgggtg	30720
ccgaggagct	ggatccgctc	gctgaggagt	tggtcgcggc	agctcgcgag	gtcgggtcgg	30780
tggttctcgc	gggtgatggg	ggccggttgg	cggggcggat	cgggtgtgat	cgcgtggtcc	30840
cgggtggggg	gcggctggct	tcgggtggtg	gggagatgca	gcgggagggc	agcgtggtcg	30900
gtgtggtgtc	cgcgcggggc	cgggcggcac	tgccgggtgc	ggatgtcggg	cttggtgtga	30960
cgcgtggtgg	tgaggttccg	tggggtgcgc	acctgatctc	gggcgcgagc	ctgggggagt	31020
cgtgtgcgtt	ggttagtacg	gtcccgaacc	cgcgttatgt	cagcgtgcgt	agcgcgcagc	31080
tgctcgttgat	cggttcggtc	agcggggcgg	tggtcggcgc	gttcgggcct	gccatcggga	31140
gccaggctcc	tgccggcggt	ccggtggccg	tggtgcggc	aatcgcgctc	ggcgtcggga	31200
cgtggtgggg	gatgcaggcc	gcgtggcgtc	cggttccgcg	cgcggtgccg	cgcactgcct	31260
ggcatgcgat	gggccccggc	atggtgctgg	agctgctcgg	cagttcatcg	cagggtctga	31320
ccgatgatgc	ggcgacagag	cgtttccaag	gtcaggacga	ggggacgggc	cttcgccgga	31380
tggtgtgtgt	gcgggcgtcg	ctggaggagc	tgccgagccc	gttgacgccg	gcgttgggcg	31440
gtggggccgc	gatctcggcg	agtatcgggtg	ccgttgcgga	cgcgacgata	atcatgggcg	31500
tgctggggat	gaacgcgttg	atcggcggcg	tgacgcgat	caccgcggac	cgcgctttga	31560
acaggcttct	ggaggccagc	gttgttcggg	ttgtggtgcg	ccgtaaggaa	aatgtgacgc	31620
agttgccggc	tgacgagctc	gtgctcggcg	atgtggtgga	gttggtggcc	ggggatgctg	31680
ttccggccga	ctgccggctt	ctggaggccg	acgggctgga	ggtcgatgag	tcgagcctga	31740
ccggggagtc	gatgttggtc	accaagacgg	tgacggcgac	tcgggcgggtg	ccggtcgcgg	31800
accggacgtg	catgatctac	cgggggaccg	cggtcgctgc	cgggcggggc	gtgggtgtcg	31860
tggtcgcgac	cggcgcgaac	accgaggcag	gcagcgcgat	cgggcccgat	gcccggcgag	31920
gtgccgatgg	tgctcgcggc	cgcctgcaga	cgttgcccaa	ggtgacgggtg	ccgatctcgc	31980
tgggagcggg	tgggattctg	ctcgtcacgg	acatgctgcg	taggcgtcca	ttggggacat	32040
cgtcggggcg	ggcgggtgag	ctggcggtgg	cggccgttcc	cgagggtattg	ccgttcggtg	32100
ccaccgtcgc	cgaactcgcg	gccgcccgcc	ggctgtcgaa	acgcggggcg	ctggtgcgta	32160
actccgcgac	gatcgaggct	ttggggcggg	cgcagggtgt	gtgtttcgac	aagaccggca	32220
ccctcaccga	agggcgcatc	gcgctgcggc	aggtatccga	tgccgcgtcg	agccggtggc	32280
tcgaggaaat	ctccacagtg	gaacggcgag	tgctcgcggg	tgccctgcgg	gcaagtccgt	32340
tggtggagaa	cggagaactg	ctccgcgcatc	ccaccgatcg	cgcggtcgtc	gatggcgcg	32400
gtggcgcggg	agtgcacccg	gccgaaggca	agcagcgctg	ggtaccgatc	gacgagatgc	32460
ccttcgagcc	ttcccggtgg	taccacgcgg	tgctcggcac	ctggcgcgac	ggcaatctgc	32520

tgagtgtgaa	aggtgccccg	gagatcgtgc	tggcccagtg	cacccggtgg	cgcagatcag	32580
atggcgacgt	gccgttggag	gagaccgctc	gtcagggcgt	cgagcgagtt	gtcgaacc	32640
tcgcccggca	gggtaccgg	gtgctggtg	tcgcgagcg	ggccgcctcg	gaccgcagtg	32700
atctcgacga	gtcccggatc	cggtatctgc	ggctgatcgg	tttcgtcgcg	ctggccgacc	32760
cggtgccggc	cactgcggcc	gccgcctcg	cgcagctcca	gcaggcaggt	gtcagaggtcg	32820
tgatggtcac	cggcgaccac	cccagcaccg	cagagggcat	cgcgcggaa	ctcgacgcgc	32880
tcaacgagcg	tcgctcatg	accggcaccg	aactggacac	cctcgacggc	gaccaactgg	32940
cggcggaagt	gaccaccgtc	gcggtgttcg	caggggtcag	cccggcgag	aaggcgcgca	33000
tcgtcgacgc	cctgcaacgc	aacgaccgtg	tggtcgcggt	gaccggggac	ggcgccaacg	33060
acgccccggc	gatccggttg	gccgacatcg	gcacgcgct	ggcgagcggc	gcaacccccg	33120
ccgcccgcga	ggccgcggac	ctcgtggtca	ccgatgaccg	catcgagacc	atcgtcgacg	33180
ccattgtgga	agggcgcgcc	atgtgggcat	cgggtgcgtga	ctcgttgccc	atcctgctcg	33240
gcggcaacct	cggcgagatc	ggcttcaccg	tcgtcaccgg	tgtgatcaac	ggcgggggca	33300
gcctcaacgc	ccgccagttg	ctgctggtca	acctgctcac	cgacatcctc	ccggcgatgg	33360
cgatcgcggt	gcgaccaccc	ccgacgatca	ctgcggagat	gctgctggca	gaaggccccg	33420
aagcctcgct	gggcgctgcg	ctgaccgcgc	acatctaccg	ccgcgcgcgc	gtcaccgcgc	33480
gggcgcgcat	ttgtgcgtgg	atcctgggca	gggcgaccgg	aacctgcgc	caggccaaca	33540
cggtcgcgct	cgtggcgctg	gtcgcgcgcc	agctcggaca	gacctgggtc	gtgcgcggac	33600
ggacaccact	ggtcatggcg	tgtgcgcttg	tctcgttcgt	ggcactggcc	gctgtcgtcc	33660
aaactcccgg	cctgagccaa	ttcttcggag	ccagcccgt	actcccacac	ggctggatga	33720
tcgcccgtgg	cgcaacgacc	gccgccaccg	tcacagcct	cttgcctcaa	caatggtgaa	33780
cctccatgca	tgagcgtcaa	gatcccttca	ccacagccat	cgtcggggcc	gactcgggac	33840
aacttcgagc	aggcaagacg	ttggagcgcc	gagagcggtg	aacgactcgc	cagcggcgaa	33900
agcgctcgcc	cccagccgac	gggcgggtgga	cccacaatgg	gagctgcggc	gacgtgcatg	33960
cggtcgggtca	tcaggatctc	tgtcgtgagc	ccgtccggat	agatgaccgg	ccactgcggg	34020
taggactcgg	cgatcactag	gtcgtagtgc	tcgacctgga	gacctgaag	agccgcaccc	34080
ggctcggctt	gaacaatcac	cacatccagt	cctggacgcc	gccggcgtag	acgagtgcgc	34140
acctcgggga	acaggatgaa	ggtgacggtc	tgcattggagg	ccacacgcag	acgttgcgag	34200
atctcgccac	gtgagcgatt	gatctgagtg	cgcagcgtct	ccagctcagc	gatcaccggg	34260
tcgctgcct	ccacgacgag	ctcaccttct	gccgtcaggc	ggacgcgacg	gccttcgcgc	34320
accagtagcg	gagcggatgc	cgcccaccgt	gccgcgcgag	ctggcccgcg	gcataaccgc	34380
cagcagtggt	ctgaccagtg	ccaacatcgc	ccacacgggc	ccggtcggcg	accttgatca	34440
gtggtacagg	ctgggcaggc	cagcgggcaa	cgcacgcct	ccccgcaccc	accacgatca	34500
acatcggccg	agatcgtaac	gaaccccgtc	ggtgggttcg	aagtgggttcg	aacagttgtt	34560
caagctgtaa	gtgcgctgcc	agccatgacc	gggtacaat	aaaacgctag	ttctaccgag	34620
gtgcgggtgag	tcgtgtctgg	ggttgcggtt	cgggaggtcg	gtcgcctccc	atatgaggtg	34680
acgagctttg	tggggcgccg	tcaggcgggc	acaagagtta	agcgcgcgct	gtccagttca	34740
cggttagtga	ccctgactgg	tttcggcggg	atcgggaagt	cccggctggc	gctgcacgtc	34800
gcacacgacg	tgccgggggc	cttctccgcc	gggacatttc	tggtggagct	ggctaacgtt	34860
cgcgatccca	tgtggtgcc	gcaggcggtc	gcggtgctc	ttgggatcca	tgaccgttcg	34920
acacgtgccc	cggaggccgt	gctcgtcgat	tacttggcgg	acaagcaagt	cttgcgtggtg	34980
ttggacaact	gcgagcacct	gctgggggcc	tgcagccgac	tagtcgctgt	gctgctggcc	35040
gcggccccgc	ggttgcggtg	acttgcaacc	agccgagaac	atcttaggat	agtggcgga	35100
cagacctggc	cggttccgcc	actgtccgtg	cctgctggca	gcgattcatc	aacgtcacia	35160
caggaagggtc	gtccctacca	gcgtgaagcg	ttgacctgt	tcgagcagcg	tgccgcggcg	35220
gcgctaccag	ggttcacat	caacgaagaa	aacgaacaga	tcgtggccag	gttatgcccg	35280
aggctggacg	gcattccct	agcgatcgaa	ctcgcgcgcg	tgccgcttcg	cgtgctctca	35340
gtcgggcaaa	ttctaaccgc	aatggagaac	cgattccggc	tgctcaccac	cggcgaccgc	35400
gccgacgatc	ctcgcatca	gacctgcgc	gccgcgctcg	actggagcta	caacctgtgc	35460
aatgagcatg	agaagcagtt	gtgggcgcgc	tgttcggttt	tcaccgacga	attcgatctc	35520
gacgcagccg	aaaacgtctg	caccggcgac	gggtgaccg	atgatgacgt	cttcgcgcgt	35580
ctcgcgggac	tgatcgacaa	gtccgtgctc	acccggaccg	aggagcgac	gaagacgaga	35640
taccggatgc	tggagactat	ccgtcaatac	gggcacgacc	ggctcaccga	ggcggtgccc	35700
gaaaacgctc	tgcgctgccg	gcaccgcgac	tactacctgc	atctcgccga	gcagtccgat	35760
gccgagtcgg	cggggccgca	tcaagccggt	tggtcgcgc	gtctgcgcgc	cgagcgcggc	35820
aacttctggg	cagcgttggg	ctactgcttc	accacacctg	gcgaggcgtc	ggttgggttg	35880
cggatggtga	gcgcgctgtg	gttctactgg	gctgctggcg	actatctgag	ggagggccgc	35940

atgtggctgg	acagggcggt	ggccctggag	accgaaccca	ccagccagcg	tgcccgcgca	36000
ctgtggatca	ccggatggat	tgcccaccgg	caaggggacc	gagatggggc	gctggctctg	36060
cttaacgaaa	gccgcgagct	ggcccggaaa	ctggggcgacg	aaacggaatt	tacctacgcg	36120
actcagtttc	ttggcgaccg	ggagatgtgg	gacaacaacc	tgactcgcg	cacgcaactg	36180
ctcgacgagg	cactggcccc	ccaccgcgca	actggccact	ggaccggccc	cgccttagcc	36240
atcttctcaa	tacgagcgca	ggcagcgggc	ctgcttggag	accttgaccg	ggcgatggtc	36300
cttctgcacg	aatgccgcaa	gatctgtaca	gaacttggcg	agcgctggag	gctatcgtgg	36360
gcgagtgga	acatggcgat	cacttgggtg	gccgcggggc	acccaaccaa	ggcagccgcc	36420
tccgcgtcca	ggccccctcg	caataagcg	gaactcaacg	acctactcgg	gatcagcgac	36480
tgcgttgaac	tgctggcctg	ggtcgcgcgc	gcagaacgca	atcctgaacg	cgcggcgac	36540
cttttcgggg	cgttggataa	aatgtgggaa	ctgattggca	ccccgctgtt	cggatccgag	36600
acgctactga	cctggcgatg	gcaggccaag	gcacgcgccc	aggaagcact	cacagacacc	36660
gaatacga	ccgcccagag	ccaggggacg	cggatgaacc	gggagcagac	tatcttctat	36720
gctcttgggg	agaagccacc	gccggtcgaa	gcgccgcgcg	cttcggctcc	ggaaaccgaa	36780
ccggttctca	caaaacgaga	acgcgaggtc	gctgccctgg	tcaccgctgg	caaaacaaac	36840
aaagagattg	cggctgacct	ggtcatttcc	cagcgcacag	ccgaggccca	cgtcgagaac	36900
atcctttcca	agctgggctt	tacctcgcg	gcacaggtca	tcagttggat	gaccgggcag	36960
agataacgta	gtcacctgct	ctgttggccc	atgcccttct	cgggccagcc	cggctcacat	37020
gatccgttcg	cggcccggca	acaccgccc	tcgtggcaag	gtctgcgata	ccgaaagcgg	37080
acatccgctt	cagctaatac	tccgcggccc	ccgcaacggc	gcatgttgaa	gtaggtatgg	37140
tccatgatcg	gaggetggcc	attgccgatg	gccatgaccg	cggagtccgg	gtgctgcatg	37200
tagttgcggc	cgccacata	ggacccggtg	gcgagcttac	gcggtataga	ttgagccacg	37260
ggccagcttc	gtaggccttg	gctgttgccg	ccgacgagta	gtgagtagcc	gggtgtaacg	37320
gtctcccagc	accatcgagc	caccgttcgt	ccggcttgta	gtgcccgtgc	gcgaagcctt	37380
gcacacgtcg	atagcgggct	cttgagccaa	aaactcgtcc	cgttccaaca	cgagcacatc	37440
gagtcgcgga	ccagcgagcg	ccccggcgac	ctcagtcag	cctccaccgg	acccgacgat	37500
cgccacgtct	gccgatgccc	ggttgtcctt	gtgcatgac	tgttgtgcct	aactgcgccc	37560
agctttcgtc	atcgagcctg	tcccacagtc	tgccgatgcc	cggtcgagc	agcctccagc	37620
gccgcccgtg	cgaaggccaa	cgaccagacc	ccgtcttggc	cggaggccgg	gggctcggcc	37680
tcgccacgca	cagcctcgat	gaaccgtcga	acaccacga	cgtagaggtc	ctcgcggtta	37740
cccagatcga	tcttctcgga	cccggccgga	ccgacgtgtg	tcagcgtgcc	gaccggtgac	37800
atcgactgga	taccctgtcc	gatgagcgct	ccttcgggtt	cgaaaacctc	caggcatgtg	37860
ggggcatgtc	cggtcacgaa	gctttccacg	aatgaagcat	gcacaccgct	gacgaactcc	37920
gcgcttccgg	agattgtctc	atcgattccc	accctcgtca	tgtggccgga	cgaggtatgg	37980
gccacgaccg	ttagcggatc	ggcattgagt	acgaaccgga	gacagtccgc	gtcgtgcacc	38040
gtgaggtcga	gtgcgactcc	ggcgcccgtc	gccgaatcgg	tcgtccgcca	tctccgcgcg	38100
gcgggcggca	gtcggatcgc	gttccggacg	ttcactgcga	ccggctcgcc	gatgtcgccg	38160
gcggcgattg	catcccggat	caaacgatgt	ggcacggagt	tgcgcatgtg	gtggtttgtc	38220
gcgaacacta	cgctgcctt	ctccgcggca	tcgacaagtt	cttgtgcctc	ggcgacggtc	38280
agggcaagcg	gtttttcgca	caggacgtgc	ttgccggctg	cgatcgccgc	aagtgttga	38340
tcgtgatgtg	ccgagttgat	actcgagatg	tacacggcgt	cgacgtcagg	atcgctaagc	38400
gccacgggtg	gttcgtcatg	gccccggg	ccgaatgggtg	ccgctacatc	ctgcgtcgg	38460
gccaggtcgc	cgctgacgac	gctgaccacc	cgggcgctcag	gctgggcgga	gatcgctggg	38520
cctacaaatg	cgcgggcgat	gtcgctggcg	cccacgagcg	accagcgga	gggacgggtt	38580
gtcatgatcc	gatgggttcc	tttcgggaat	accgcgcctg	tgcgacattt	ccgctggcgc	38640
acagacgtga	ggccagcgcg	gggtggcgcg	aggattacac	gaccatgaaa	cgggtcgccg	38700
cttgactgtt	agcaagatcg	gaggtttcgc	ataccccgcc	tgatctcgct	tgcccacgag	38760
ctgtcctggg	agtgccaggt	cgtcaggatt	ttgtcagcgc	tccttcccca	cccggctgca	38820
cgtctcccga	gccggccttc	cggatcgaac	agcccgacat	cgccgtcggc	tggctggatg	38880
ccgtagcgtc	ggcgtagctg	tttccaggga	gtacgcgggt	gtttgcgctc	ctgccaccgg	38940
acgacctctt	tccagagata	cgatcgtagg	tagctgaagg	tcgcgttcgg	gcattccatac	39000
ctgaagtacg	ccttccaggc	agcatccggt	tccggatagc	tttcaatgtg	gggaaaagct	39060
gggtcgccgg	cgacccgaaa	accgacggca	ccgctcgcg	gcagcgtgca	ccctggaggc	39120
gaggtccgtg	ctgctgatcg	tgatcccgtc	ggcgagtggg	tagccctgga	tgaccgtaga	39180
tcagcgcacg	taggtgatga	gtttgggctc	gggatcgctg	acgtcagtga	ccccgaggag	39240
cggacatggc	ttcgggttgc	gctgatctgg	agacaggatg	tttgtcgggg	ttacacgttc	39300
tggagcagtc	cgccatcgac	acggacaacg	gatccggtga	tgtagctggc	acgctcgctg	39360

gcgagaaatg	tgaccgcgtc	ggcgaattcc	tgcgcgcgcc	cgtagcggcc	gaccggaata	39420
gagctctctg	attccctcgc	gatgttctcc	gcagtgcggg	tctcccgtgc	ggccttttgc	39480
tgggtccaa	gggagatg	cgcagtgagg	atgcgccccg	gaacgacgat	gttgctgggtg	39540
atgccgtcgc	ttgccacctc	accggacagt	gtcttggacc	agcccaccag	actcgagcgg	39600
agggcggttc	acaacccgag	gttggggatg	ggcgcgatga	cgcgggacga	agtgcagctg	39660
atgatccggc	cccatccccg	ctcggtcatg	cccgggagca	cgcgggtctgt	gatcgcgacg	39720
acggagagga	tcatcgcttc	gaagtgcga	cgcacacagg	tggcgctctg	cccggacaca	39780
cgggtggggc	gcgggcccgc	ggtgatgttg	accaggatct	ccaccggggc	gagctcgctc	39840
tcgacgcgg	tgacgttctc	atcgatgacc	gacaggttcg	ccaagtccca	gaccaggctc	39900
atgttatcgc	cgggtcatgga	cgcctcgacc	tccgtgagcg	cgctccttgc	gatgtcggcc	39960
agcgcacac	gcgcgccttc	ccggcttagc	gaggcggcaa	tggccgaacc	gagtccgccc	40020
ccggctccga	gtacgagggc	gactcttcca	ttgatgtcga	gatccatgac	atgtccttgc	40080
ggttttcgggt	gacggcggcc	cggaaagtgc	tggcacgcgc	ttgatggagg	gacattgggtg	40140
ggaggagtgg	cagtggcccc	gtcagccgcc	taccacggcc	tgagcgcgtg	cctcgaacag	40200
gacaccgggt	cggagaccgg	cgggtgatgt	cgtccggggc	gggcccgggt	cgctgaagta	40260
ctcgcggtag	atcgcgttca	tgcgctcgaa	gtcgtccccg	tcagcgagga	acacattcac	40320
ggtgatcacg	tctgcctcgc	tcagccgggc	tgaacgcagc	gcgggtcatga	ggttctcgaa	40380
tgcccggcgc	acctgaggtt	ccagaccacc	cgggtgcgag	gatctgtcgg	cgaggtagcc	40440
gcactgccc	gcgattgcca	cgatgttgcc	gatgcgtacg	gcggcggagt	aagggcctcc	40500
cgcgggagga	aggtcgacgt	ctgtgaacgc	ctgacggggc	acgggtgtcgg	ggcctctctg	40560
tggctggtgg	tcatgtccaa	ctgacttcgg	gagcttgtgg	ggtcgggttc	accggagcct	40620
cccgtaggag	gtcctgagcc	ccgtcagaag	aacgtgagga	cgcgcgtcgc	gacgttgaag	40680
tcgtcgtcga	tgatcgggat	gaaggggagc	ttgtcgaagg	ccgtgcacgg	gtgggacatg	40740
tcgaaagcga	cgatgtctcc	gggagcgatc	gcgagcccgg	gggcaacgcg	aacgaaggcg	40800
tctgtgtcca	tcagcttgaa	cgtctccgct	tcccgcagcc	gctgcctcga	gccatccgcg	40860
cgaaacagct	cgcgtggctg	tggcagcgtc	aggtcatggg	ccgcgtcgcg	cttcccgcgc	40920
gacaggatcg	cgagatcagg	ctccggccgg	gacagcacgg	aagcccatgc	agtgagtgcg	40980
ttgtggagcc	ggagcgggtt	ctgctcggcc	cgtcggccag	cgagcggcga	gagcttttctg	41040
tacttgccgg	cgtcgtggga	gatgtaacag	ccgcttcgaa	gcactaggtc	cacgtcgtcg	41100
cggacaccgt	cccacgagcc	gagtcgggcg	acgacacgat	cgaagtacga	gcttccgcct	41160
gccgtcacga	tgatgcgggt	ggcgtcgaac	aggtcgcgac	gtgccagctc	gagcacgacg	41220
gaccggacgc	cagcgaagaa	ggtgtcgagt	gcattggagg	cctccgggtg	catgccgcgg	41280
gtcacgaagg	cctcgtaggc	ctcgacgcgc	accagccgga	gatgctcggt	cgcggcgacc	41340
gccgcggcga	cctcgagcgc	cgagtcgagg	tctcgcacgc	cacacctgcc	accaggcact	41400
ccgacctcga	ggaggacgtt	gagggtgacc	ccgtggccgg	agtcggcgat	ggtatcggac	41460
atcgcgccga	ccgtgtccgc	atcgtcgacc	aggcagtaga	agtcgaacga	gctgtcgcgtg	41520
gcgatttcgg	cagtcaccca	acgcagcgcg	ggagcatcga	cgagttcgtt	ggccaggatg	41580
atgcgctgaa	ccccgtagcg	gcgcatacgc	gccacctgag	tgggcgtcgc	tgccgtgaac	41640
gcccacgcac	cgtgagacgc	ctgaaggggc	aagagctggg	gtgacatggt	ggtcttgccg	41700
tgcggggcga	gaagcgcgtt	gttgcgctcg	cagtacgcct	ccatagtcgc	caggttggcg	41760
ttcatagcgc	gtgcgtggag	tgtggtcacc	ggcagggcga	ggtctccgcg	ggccacgttc	41820
cagttctgct	ggtccacctc	tccgaggagc	acacgagcac	ccaggggcac	gcccttgagt	41880
gcgtcgtcga	ggacggtctc	gcggaggctc	tccgcacatt	gcaggagtgc	ggtccggctg	41940
agctgctcga	ccgcgtgagt	gctcatcgtg	tagtggcctt	tcgcgcgcgc	gtggtcagct	42000
gaccgatgcc	gtcgatccgg	cactccacac	ggtctccgtc	gccgatgacg	agcgcgccag	42060
gggttccggg	ggagatgatg	tctcccggaa	acagcggcat	catcttcgag	tggaagctca	42120
cgaggctggc	gggcttgtgg	gtcatgtggg	cgaccgtgtt	ggtcctgaac	tcatcgccgt	42180
tcttgaccgt	cgagatctcg	atgtcgtcca	agcttttcgaa	cttctctatc	acctcatcga	42240
gcggtacgag	ctccggtccg	aagcagaaga	acgtccggaa	gttcttcgag	cgggtgagat	42300
agcgcggatt	gatccgcaag	atgtcctcgg	cggctctggtc	caggatgggtc	gtgaccccc	42360
acacgtagtc	catcgcctcg	gactcgctga	cgttctcgca	agtcctgccg	atgatgagcc	42420
cgatctcagc	ctcggacgtg	gtgcgctcac	tctgcgcggg	aatcacgatc	ggctcatccg	42480
ggccgatgat	cgtgtggctg	cacttcacga	aggacgccgg	ctgggtcgggc	gccgactcgc	42540
tcaggctccg	tgcgtgatcg	ccgtagttca	gaccgatgcc	ccagatcttc	cggggggatc	42600
ggtacggcgc	ggtgaaccgc	acctcgtcca	cgcgtgtgaa	ggcgaggctg	ggggcggtct	42660
tgacacgctc	acgcagccgc	gcgaggtggt	ctcctgcgat	cacgtccatg	atggtcgtga	42720
ccgccagctc	ggggtctatc	tcccggattg	ctgcgacgcc	gcggctcgtc	acgacaacgg	42780

ggatctctcc ttccgcagcg gtgatggtcg ccaggtgctc ggteacgaaa gcccgctcctt 42840
 cggtcgaatg gtgaggtagg ggggtggggga gttgggtttaa ctcgttccccg ggggcacggtt 42900
 cccgcgctgc gtgtgtgagg agaggacaag cgacatcacg tggaggatgt ggtcggcggtt 42960
 gttccggggt gcccggtcgg cgtcgccagc cagaacggcg gatgccgtcg cgatgtgctc 43020
 cgaggcgag gagatggagt caccggtcga gggagtgtcg cgttctcgga gtacagcggt 43080
 cagcaccagg gcgttgtcga ccgcgcgctg gaggatctcg ttcccgcaga actcggcgat 43140
 gatgtggtgg aagacgcgat cctcggcgcg gaactgggcg gagtcccgcg actctgccgc 43200
 gcgcagggat gagggtggcga cctcgtggag cctctcccgt tgggcgctgg tagcccgatg 43260
 tgccgtgaac caggctgccg agctctccag ccccgcccg tgctcgtagg cgtcgcgaat 43320
 ggcgcggaac gaggcgctga tgacgcgcag ccccttcggg gcagcctcga ccaggccac 43380
 gtgccgcaag cggagaagcg cctcgcgcac ggggggtcttg ctgacattca gctcggccgc 43440
 gagcttggcc tcgctcacac gacgccagc tgggagtgc tgacttacga tgctgtcgcg 43500
 gatggcctcg aagaccgat ctgtcagatt gtcgacgct gcgtcgagg gtgcgagcat 43560
 accgttgccg gacccaccg cggagtctgc ggcggctggg cgatggtgca gctccaccat 43620
 gttcagcgtg cccgcagtgc gtggtgatt cggttccatc gtcccccttc cttggacagt 43680
 ggaatacgg atatggtcct caccgcgtaa gcaaccgccc gaggcgggac tccgtagcgg 43740
 atgaagtct tgggatatgt cgtataccga gggagagctg atgaagccc agtcgcaccc 43800
 ggccttcgag agcctggatc gactggccac gatcgagatg cgtccgcga cgagcccggc 43860
 cggcatcgtg agcccgcttct acacgctggc gcggggtgag cggtcggagc cgatcagcct 43920
 tgcgatcgcg cgtctctctgc tgcgtcgaca ggggtgaaaag gcgttgatcg tcacgggtct 43980
 ggtcgaggaa ggccggttcc cgcaggggga ggtggacggc cccatcggt ctctggcact 44040
 cgcgcgcag ctgcgcggtc ttggtagcga ggtgaccatc gtcacgacc cagaggcgt 44100
 cggcccggtg gagaagctgg tcgacgctgc gggcctggat ggcgtgacct tgatggagtc 44160
 ccgattctcc agcgcggccg agggccggga gttcgcggcg cagtccggcg tcgtcgcgc 44220
 catcgagaag ctggggcaga actctgtttg cggccgtcat ctgatctggg gcacgcgggt 44280
 caccgcgggt gatctgtttg ccgacgacta ccttcgcgc gccacggaca acggtgctct 44340
 gacgctggcc gtgggagaca acggcaacga cgtcgggttc ggcaacattg ccgcgcggtc 44400
 cgaggcgctg actccgcgag gcgtcagcgt tgagggcgga ttcttcgcgt ccacgacggt 44460
 ggatcatctg ctgcctgcat ccgtgtcgaa tttgggctgc tacgtcatca ccggtgcggt 44520
 ggccatcctg gtcgacgcg caaacctggc agtcaccggg gatctggtgc gcgagtggac 44580
 cgagctgggg ctgcgcgcag gtctacgcag cggcgcggtt gacgatcccg cgttccaagg 44640
 cgacgacggg atcccaactgc gtttcgtcgc cgcgcgatgc gagctgatct ccggaatcgt 44700
 tcaccagagc ctgctcggcg acccctgggt ggcagaccag tgacggccac ccgtagcggg 44760
 caaccctcgg ttgccagcct tcgtcatcat cgcggggaag gggaagtcat cgatggagtt 44820
 cgttgatctg cagcacgcgg agcccatcga ggcattggcgt gccaacgcg cgaatgcgtg 44880
 ggcgaggccc acgtccggga tctgtcatgg attcgtgcag gccaacctcg tgatgctgcc 44940
 ccaggatgac gcgttcgact tcatgcggtt cgcgcagcg aaccccaagc cgtgcccgat 45000
 cctcgaggte accgacgcgg gagatccgga gccgaagctg accgcccctg gtgctgacct 45060
 ccgcaccgac ctgcccacaa acagcgtgta ccgggaaggg gcgctggtgg aggagcgcag 45120
 tgacgtcgtt gacctgtgga ccgacgacat ggtcgcgttc ctgcttggct gcagcttctc 45180
 cttcgagcac ttgctgctcg atgccggact cccgatccgg cacatcgacc aggggatcaa 45240
 cggcccggtt tacctcagca accgtgagtg tgtgcccgca ggccagttcc gggggaagct 45300
 agtgggttca atgcgtccca tgcccccgga ccgggtggcg gaggctgtca ccatcacgca 45360
 tgcccatccc gaggtgcacg ggggccccgt gcacatcggc tcccctgaga agttgggcat 45420
 cgacaacggt gatgaacctg actggggtga acgagtgcgt atggagccgg gcgacgtgcc 45480
 ggtgttctgg gcctgcggcg tgaccccgca gcaggcgcg atcgaggcga agaccgagct 45540
 aatgatcacg cactcgacgg gtcacatggt cgtgaccgga atgcggatcg actccgagtg 45600
 aggcgggggc cccggggtgg tgcc 45624

<210> 5

<211> 50000

<212> DNA

<213> Saccharopolyspora spinosa

<400> 5

gggcgcgcgc caattcgatg acgttcatgc gccgtgtcgg ggaatcgccg gtggcggcgc 60

cagcagagggc	tgaacttact	ggtggtgtgt	ccaggaatcg	gaggggcagt	accgaatgag	120
cgaagccggg	aacctgatag	ccgtcatcgg	actgtcctgc	cgcctacccc	aggcgccctga	180
cccggcttcc	ttctggcggt	tgctgcgcac	cggaaacggac	gccatcacca	cggccccgga	240
agggcggtgg	ggcgacccgt	tgcctggtcg	ggatgcgccc	aagggcccg	aatgggggtg	300
tttccctggct	gatgtcgact	gcttcgatcc	cgagttcttc	gggatctcgc	cgcgagaagc	360
ggcagccgtg	gatccccagc	agaggctggc	tctggagctc	gcctgggagg	cactcgaaga	420
cgccggtatc	cccgcggcg	agctgcgcgg	tactgcgcgc	ggtgtgttca	tgggggcgat	480
ctctgacgac	tacgcgcgcc	tgctgcgcga	gagcccgccg	gaagtggctg	cgcagtaccg	540
cctcacccggc	acccatcgaa	gcctgatcgc	caaccgcgtg	tcctatgtgc	tcggcctcgc	600
cgggccaagc	ctgacgggtg	attcagggtca	gtcctcgtcc	ctggtcggcg	tgcattctgc	660
cagcgagagc	ctgcgacggg	gtgagtgcac	gatcgcactc	gccggcggcg	tgaacctcaa	720
cctggccgccc	gagagcaaca	gcgctctgat	ggacttcggc	gcgctctccc	cggacggctc	780
ctgcttcacc	ttcgatgtgc	gggcgaacgg	ttacgtccgt	ggtgagggcg	gcggccttgt	840
cgtgctgaag	aaggccgata	aggcgacgc	cgatggcgac	cggatctact	gcctcatccg	900
cggcagcgcg	gtcaacaacg	atggggggcg	tgcggggctc	accgttcggg	cggcggacgc	960
ccaggcggag	ctgctgcgcc	aggcataccg	gaacgcgggc	gtcgaccccg	ccgccgtgca	1020
gtatgtcgag	ctccacggca	gcgcgaccag	ggtcggggat	cccgtcgaag	cagcagccct	1080
cggagctgtc	ctggggggcg	cgagacggcc	cggcgacgag	ctgcgtgtgg	ggtcggcgaa	1140
gaccaacgtc	ggccatctgg	aagcagcggc	gggcgtcacc	gggttgctga	agaccgcact	1200
cagcatctgg	caccgcgaac	tgcgcgcgag	tcttcatttc	accgccccca	acccggaat	1260
cccgtcggac	gaattgaacc	tacgcgtcca	gcgtgatctg	cggccgtggc	cggagagcga	1320
ggggccgctg	ctggccggcg	tcagcgcctt	cggaatggga	ggcacgaact	gccacctggt	1380
gctctccggc	acgtcccggg	tggagcgacg	gcgcagtggg	cccgtgagg	cgacctgcc	1440
gtgggtcttg	tcggccagaa	caccggctcg	attgcgtgcg	caggcggcgc	gcttgccacac	1500
gcacctcaat	acggccgggt	aaagtccgtt	ggcgtcgcgc	tactcactgg	cgacctctg	1560
atccgcgctg	cgcaccggg	ccgcgctggt	cgcggacgac	gaaccgaaac	tgctcgcgg	1620
gttgaaggcc	ctcgtgcagc	gcgacgacgc	gcccacgctg	tgccacggcg	cgacttcggg	1680
cgagcgggca	gcggtcttcg	tctttcccg	acagggcagc	cagtggatcg	ggatgggtag	1740
gcagctgctc	gaaacctccg	aggttttcgc	ggcgtcgatg	tcggactgcg	ccgacgcatt	1800
ggcgccgcac	ctggattggt	ccctgctgga	tgtgctgcgc	aacgcggccg	gcgctgcgca	1860
ccttgaccac	gacgatgtcg	tcagcccgcc	gctgttcgcc	atcatggtct	cgctcgcgga	1920
gctctggcgt	tcgtggggcg	tgcgtccggg	ggcggtcgtc	gggcactcgc	agggggagat	1980
cgcggcggcc	tgcgtcgcgg	gggcccgtgc	cgtccgcgat	gccgccaggg	tgggtggcggt	2040
gcgcagcagg	cttctgacgg	cgtggccgg	cagtggcgcg	atggcctcgt	tgcagcatcc	2100
cgccgaagag	gtgcggcaaa	tcctgttgcc	ctggcgcgat	cggatcggcg	tggcgggggt	2160
gaacggaccg	tcgtcgaccc	tgggtgtcagg	ggaccgggag	gcgatggcg	aactgctggc	2220
cgagtgcgca	gaccgagagc	tcgggatgcg	ccggattccc	gttgaatacg	cctcccatte	2280
gcctcacatc	gaggttgtcc	gggatgagct	gctggggctg	ttggcgccgg	tcgaacctag	2340
gacgggaagc	atcccgatct	attcgacgac	gaccggggac	ctgctggacc	ggccgatgga	2400
cgcgcactac	tggatccgca	accttcgtca	accggtgctg	ttcgaagcgg	ccgtcgaggc	2460
cctgttgaa	cgggggtacg	acgcattcat	cgagatcagc	ccacaccggg	tgtgactgc	2520
gaacatccag	gaaaccgccc	tgcgagcagg	gcgggaggtg	gtggcgctcg	ggacactccg	2580
ccgcggcgaa	ggtggcatgc	ggcaggcgct	gacgtcgctg	gccagagcac	acgtacacgg	2640
agtggccgcg	gactggcacg	cggctcttcg	cggatccggg	gcgcagcggg	tcgacctgcc	2700
gacgtacgcc	tttcagcgac	agcgtactg	gctggacgcg	aagcttccc	acgtcgccat	2760
gcccagagagc	gacgtgtcga	cggcgttgcg	ggaaaagctg	cggctcttcg	cgagggcgga	2820
cgtggactcg	acgacctca	cgatgatccg	ggcacaggca	gccgtggtcc	tcggccactc	2880
cgatccgaaa	gaggtggacc	cggatcggac	gttcaaggac	ctgggcttcg	attcctcgat	2940
ggtggtcgag	ctgtgcgacc	gcctaaacgc	cgccacaggt	ctgcgactcg	caccgagcgt	3000
cgttttcgac	tgtcctacgc	cggacaagct	cgcgcgccag	gtacggacgt	tgttgttggg	3060
cgagccggct	cccatgacgt	cacaccggcc	ggactccgat	gcggacgagc	ctatcgccgt	3120
gatcgggatg	ggctgtcggg	ttccgggtgg	ggtgtcctcg	cccaggaggt	tgtggcagtt	3180
ggtcgcgcgt	gggcgggacg	tcgtgtccga	gttcccggct	gaccgaggtt	gggacctgga	3240
gcgtgcgggg	acatcgcacg	tgcgcgcggg	cgggttcttg	catggcgccc	cggattttga	3300
ccccgggttc	ttccggattt	cgcgcgcgga	ggcgttgggg	atggatccac	agcagcgggt	3360
gctgctggaa	atgcctggg	aagcagtcga	acgaggcggg	atcaaccgc	agcacctgca	3420
cggaaagtcaa	accggggctc	tcgtcggcgc	gacctccctg	gactacgggc	cacgcctgca	3480

cgaagcgtcc	gaggaggcgg	ccgggtacgt	gctcacccggc	agcaccacga	gtgtggcgtc	3540
gggtcgggtt	gcgtattcgt	tccgggttcga	gggccctgcg	gtgacggtgg	atacggcgty	3600
ttcgtcgtcg	ttggtggccc	tgcatttggc	gtgtcagtcg	ttgcgttcgg	gtgagtgtga	3660
tctggcgttg	gccgggtggtg	tgaccgtgat	ggccacgcgc	gggatgttcg	tggagttttc	3720
gcggcagcgt	ggtttggcgc	cggatgggcg	gtgcaagtgc	ttcgcgagg	ccgccgacgg	3780
caccggctgg	tccgaggggtg	ctggcctggt	tctactggag	cggttgtcgg	atgcccggcg	3840
gaatgggcat	gaggtgctgg	cggttgttcg	tggtagtgcg	gtgaatcagg	acgggtgcgtc	3900
gaatggtttg	accgcgccga	atggttcgtc	gcagcagcgg	gtgattgccc	aggcattggc	3960
gagtgccggg	ttgtcgggtg	ccgatgtgga	tgctgtggag	gcgcattggga	cgggcacgcg	4020
gcttggtgat	ccgatcgagg	cgcaggcgct	gatcgccacc	tacggccagg	gccggcttcc	4080
ggaacggcca	ttgtggttgg	gctcgatgaa	gtcgaacatc	ggtcacgcgc	aggcagctgc	4140
ggggatagcc	ggcgtcatga	agatggtgat	ggcgatgcgg	cacgggcagc	taccgcgcac	4200
gttgcacgtg	gatgagccga	cttctggggg	ggattggctg	gcggggacgg	ttcaactcct	4260
tacggagaac	acgccctggc	ccgggagtg	tgcgttctgt	cgggtggggg	tgtcgtcgtt	4320
cgggatcagt	ggtactaacg	cgcacgtcat	cctcgaacag	cccccgagg	tgccgagtca	4380
gtctgcgggg	ccgggttcgg	gctctgtcgt	ggatgttcgg	gtggtgccgt	ggatggtgtc	4440
gggcaaaaca	cccgaagcgc	tatccgcgca	ggcaacggcg	ttgatgacct	atctggacga	4500
gcgacctgat	gtctcctcgc	tggatggttg	gtactcgctg	gcgttgacac	ggtcggcgct	4560
ggatgagcga	gcggtggtgc	tggggtcgga	ccgtgaaacg	ttgttggtgc	gtgtgaaagc	4620
gctgtctgcc	ggtcatgagg	cttctggggt	ggtgaccgga	tctgtggggg	ctgggggccc	4680
catcgggttt	gtgttttccg	gtcaggggtg	tcagtggctg	gggatggggc	gggggcttta	4740
ccgggctttt	ccggtgttcg	ctgctgcctt	tgacgaagct	tgtgccgagc	tggatgcgca	4800
tctgggccag	gaaatcgggg	ttcgggaggt	ggtgtccggt	tcggatgcgc	agttgctgga	4860
tcggacgttg	tgggcgcagt	cgggtttggt	cgcgttgccg	gtgggcttgc	tgaagttgct	4920
ggatctcgtg	gggggttcggc	cagatgtggt	ggttggggcat	tcgggtgggcg	agttggcggc	4980
ggcgttcgcg	gcgggtgtgg	tgtcgttgct	gggtgcggct	cggttggtgg	cgggtcgtgc	5040
ccggttgatg	caggcggtgc	cgtctggcgg	tgggatgctg	gcggtgcctg	ctgggtgagg	5100
gctgttgtgg	tcgttggttg	ccgatcaggg	tgatcgtgtg	gggatcgccg	cggccaacgc	5160
tgcggggtcg	gtggtgctct	ctggtgatcg	ggatgtgctc	gatgaccttg	ccggtcggct	5220
ggacgggcaa	gggatccggt	cagagtggtt	gcgggtgtcg	catgcgtttc	attcgtatcg	5280
gatggatccg	atgctggcgg	agttcgccga	attggcacga	accgtggatt	accggcggtt	5340
tgaagtgccg	atcgtgtcga	ccttgaccgg	agacctcgat	gacgctggca	ggatgagcgg	5400
gcccgaactac	tgggtgcgtc	aggtgcgaga	gccgggtcgc	ttcgccgacg	gtgtccaggc	5460
gctggtcgag	cacgatgtgg	ccaccgttgt	cagactcggt	ccggacgggg	cgttgtcggc	5520
gctgatccag	gaatgtgtcg	ccgcattccga	tcacgcgggg	cggctgagcg	cggccccggc	5580
gatgcgcagg	aaccaggacg	aggcgcagaa	ggtgatgacg	gccctggcac	acgtccacgt	5640
acgtggtggt	gcggtggact	ggcggtcggt	cttcgcgggt	acaagggcga	agcaaatacga	5700
gctgcccacc	tacgccttcc	aacgacagcg	gtactggctg	aacgcgctgc	gtgaatcttc	5760
cgcgggcgac	atgggcaggc	gtgtcgaagc	gaagtctctg	ggcgccgtcg	agcacgaaga	5820
tgtggaatcg	cttgacgcg	tattgggcat	tgtggacgac	ggcgtgctg	tggattccct	5880
gagaagcgcc	cttcgggtgt	tggccgggtg	gcagcgaacc	cgcaccaccg	agtccattat	5940
ggatcagcgg	tgttaccgaa	ttggctggcg	gcaggtagcc	ggactcccgc	cgatgggaac	6000
tgttttcggt	acctggctgg	tcttcgcgcc	tcattggctg	tccagcgaac	cggaggtggt	6060
ggactgcgtt	acggcactgc	gggcacgtgg	tgcctcggtg	gtgttggtgg	aagctgatcc	6120
cgaccgcacc	tccttcggcg	accgggtacg	aacctgtgt	tcgggccttc	cggatcttgt	6180
tggcgtgttg	tcaatgttgt	gcttggaaga	atcggtcctt	ccgggatttt	ctgcggtgtc	6240
acggggtttt	gcgttgaccg	tggagtgtgt	gcgggttttg	cgggcagctg	gtgcgactgc	6300
ccggttgtgg	ttgctgacgt	gtggtggcgt	gtcgggtggga	gatgtaccgg	ttcgtccagc	6360
gcaggccctg	gcgtgggggt	tggggcgtgt	tgtgggggtg	gagcatccgg	actggtgggg	6420
cggcttgatc	gatattccgg	tcttgttcga	cgaagacgct	caagagcggt	tgtcgattgt	6480
gctggcaggt	ctcgatgagg	acgaggtcgc	gatccgtcct	gacggcatgt	tcgcgcgtcg	6540
gttggtacgc	cacactgtct	cagctgatgt	gaagaaggcg	tggcgcccca	ggggatcggg	6600
gctggtgacg	ggcggcacgg	gtggtttggg	ggcgcacggt	gctcgctggc	tggccgacgc	6660
cggagccgaa	catgtggcga	tggtagtgcg	acgcggcgag	caggcaccga	gtgctgagaa	6720
gttgcggacg	gaactggagg	atctgggtac	ccgggtgtcg	atcgtgtcat	gcgatgtgac	6780
cgatcgcgag	gcgctcgccg	aagtgtgaa	agcccttccg	gctgaaaacc	cgttgaccgc	6840
ggtagtgcac	gcggcaggcg	tgatcgagac	tggtagtgcg	gcggcaatga	gcctggctga	6900

tttcgatcac	gtgttgtccg	caaaggtggc	cggtgccgcg	aatctggatg	ccttgttggc	6960
cgatgtggaa	ttggacgcgt	tcgtcttgtt	ctcatcggtg	tcaggagttt	ggggcgctgg	7020
gggacacggg	gcttacgcag	cggcgaatgc	ctatctggat	gcgctcgcg	aacagcgctc	7080
gtcgcgaggg	ctggtcgcga	ctgcggtggc	ctgggggccc	tgggcccggc	agggcatggc	7140
ctccggagaa	acaggagacc	agctgcgcgc	atacggcctt	tccccaatgg	ctccgcagca	7200
cgccatcgcc	ggaatccggc	aggccgtgga	acaggacgaa	atttccctgg	tagtggccga	7260
tgtcgattgg	gcacgtttca	gcgcgggatt	gctggcggct	aggccgcggc	cgctgctgaa	7320
cgaactggcc	gaggtcaagg	aactcctcgt	cgatgccag	cccgaggcgg	gagtccctgc	7380
cgacgcgtcg	ttggaatggc	ggcagcgatt	gtccgcggca	ccgaggccga	cacaggaaca	7440
gctgatcctg	gagctggtac	gcggcgaaac	cgctctggtg	ctgggacacc	ccggggcagc	7500
ggccgttgca	tcggaacgag	ccttcaagga	cagcggattc	gactcgcagg	ccgcggtcga	7560
actccgcgtt	cggctcaatc	gagctaccgg	cctccagttg	ccatcgacaa	ttatcttcag	7620
ccatcccacg	cctgcggaac	tggctgcgga	gctgcgggcg	aggcttcttc	ccgagtcgcg	7680
aggagcaggc	attcccaggg	aggacgaggc	gcgaatcaga	gcggcactga	cgtcgatccc	7740
gttcccggcc	ttgcgcgagg	caggcttggg	gagtcgcgtg	ctcgcacttg	ccggacaccc	7800
ggtcgactcc	ggtatctcct	cggacgatgc	ggccgcgacc	tcgatcgatg	cgatggatgt	7860
agccggcctc	gtcgaagcag	cgctgggcga	acgcgagtc	tgagaccgcc	gacctgggag	7920
atgacggtga	ccaccagtta	cgaagaagtt	gtcgaaggac	tgcgagcatc	gctcaaggag	7980
aacgaacgcc	tccggcgcg	cagggatcgg	ttctccgcgg	agaaggacga	tcccatcgcg	8040
atcgtggcga	tgagttgtcg	ttatcccggg	caggtctcct	cgccggagga	cctgtggcaa	8100
ctggctgccg	gcggtgtgga	cgcgatctcc	gaagttccgg	gggatccgcg	atgggacctg	8160
gatggcgtgt	tcgttccgga	ctccgatcgt	cctggcacgt	cgatgcctg	cgccggcggt	8220
tttcttcagg	gcgtgtcgga	gttcgacgcg	ggtttcttcg	ggatttcgcc	gcgtgaggcg	8280
ctggcgatgg	atccgcagca	gcggttgcgt	ctggaagtcg	cgtgggaggt	cttcgagcgg	8340
gctgggctgg	agcagcggtc	gacacgcggt	tccgcgcttg	gcgtgttcgt	cggcaccaat	8400
ggccaggact	acgcgtcgtg	gttgcggacg	ccggcgctcg	cgggtggcagg	tcatgtgctg	8460
acgggcgggtg	cggcagcggt	tctttcgggc	cgggttgcgt	attcgttcgg	gttcgagggt	8520
cctgcggtga	cgggtggatac	ggcgtgttcg	tcgtcgttgg	tggcgttgca	cctggcgggg	8580
caagcactgc	gggcccgtga	gtgcgacctt	gcccctgcgc	gtggcgtcac	ggtgatgtcg	8640
acgccgaagg	tgttcctgga	gttctccgcg	caacggggtc	tcgcgcgcga	tgggcgggtg	8700
aagtcgttcg	cggcgggtgc	ggatggcact	ggatgggggtg	aggggtgccg	actgttgttg	8760
ctggagcggg	tgtcggatgc	ccggcggaat	gggcatgagg	tgctggcggg	tgttcgtggg	8820
agtgcggtga	atcaggacgg	tgcgtcgaat	ggtttgaccg	cgccgaatgg	ttcgtcgcag	8880
cagcgggtga	ttaccaggc	gttggcgagt	gcgggggtgt	cgggtgtccga	tgtggatgct	8940
gtggaggcgc	atgggacggg	cacgcggctt	ggtgatccga	tcgaggcgca	ggcgctgatc	9000
gccacctacg	gccgtgatcg	tgatcctggc	cgcccgttgt	ggttgggggtc	ggtcaagtcg	9060
aacatcggtc	atacgcaagc	ggcggcgggt	gtggctggtg	tgatcaagat	ggtgatggcg	9120
atgcggcacg	ggcagctgcc	acgcacgttg	cacgtggaat	cgccgtcgcc	ggaggtggat	9180
tggtcggcgg	ggacggttca	actccttacg	gagaacacgc	cctggcccag	gagtggctcg	9240
gttcgtcggg	tgggggtgtc	gtcgttcggg	atcagtggta	ctaacgcgca	cgtcatcctc	9300
gaacagcccc	cgggagtgcc	gagtcagtc	gcggggccgg	gttcgggttc	tgtcgtggat	9360
gttccgggtg	tgcggtggat	ggtgtcgggc	aaaacaccgc	aagcgtatc	cgcgaggca	9420
acggcgttga	tgacctatct	ggacgagcga	cctgatgtct	cctcgctgga	tgttgggtac	9480
tcgctggcgt	tgacacggtc	ggcgctggat	gagcgagcgg	tgggtgctggg	gtcggaccgt	9540
gaaacgttgt	tgtgcggtgt	gaaagcgtg	tctgcgggtc	atgaggcttc	tgggttggtg	9600
accgatctg	tgggggctgg	gggcgcgcatc	gggtttgtgt	tttccggtca	gggtggtcag	9660
tggctgggga	tgggcccggg	gctttaccgg	gcttttccgg	tgttcgctgc	tgcctttgac	9720
gaagcttgtg	ccgagctgga	tgcacatctg	ggccaggaaa	tcgggggttcg	ggaggtggtg	9780
tccggttcgg	atgcgcagtt	gctggatcgg	acgttgtggg	cgcagtcggg	tttggttcgcg	9840
ttgcaggtgg	gcttgcgtgaa	gttgcgtggat	tcgtgggggg	ttcggccgag	tgtggtgttg	9900
gggcattcgg	tgggcgagtt	ggcggcgggc	ttcgcggcgg	gtgtggtgtc	gttgtcgggt	9960
gcggctcggt	tgggtggcggg	tcgtgcccgg	ttgatgcagg	cgttgccgctc	tggcggtggg	10020
atgctggcgg	tgcctgctgg	tgaggagctg	ttgtggtcgt	tgttggccga	tcagggtgat	10080
cgtgtgggga	tcgccgcggg	caacgctgcg	gggtcggtgg	tgctctctgg	tgatcgggat	10140
gtgctcgatg	accttgccgg	tcggctggac	gggcaaggga	tccggtcgag	gtggttgccg	10200
gtgtcgcgatg	cgtttcattc	gtatcggatg	gatccgatgc	tggcggagtt	cgccgaattg	10260
gcacgaaccg	tggattaccg	gcgttgtgaa	gtgccgatcg	tgtcgacctt	gaccggagac	10320

ctcgatgacg	ctggcaggat	gagcggggccc	gactactggg	tgcgtcaggt	gcgagagccg	10380
gtccgcttcg	ccgacgggtg	ccaggcgctg	gtcagagcac	atgtggccac	tgttgctcag	10440
ctcgggtccg	acggggcggt	gtcggcgctg	atccaggaat	gtgtcgccgc	atccgatcac	10500
gccggggcgc	tgagcgcggt	cccggcgatg	cgcaggaacc	aggacgaggc	gcagaaggtg	10560
atgacggccc	tggcacacgt	ccacgtacgt	ggtggtgctg	tggactggcg	gtcgttcttc	10620
gccggtacgg	gagcgaaaca	aatcgagctg	cccacctacg	ccttccaacg	acagcgggtac	10680
tggctggtgc	catcggattc	cggatgatgt	acaggtgccg	gtctggcccg	ggcggagcat	10740
ccgctggttg	gtgctgtggt	gccggtcgcg	ggtggtgacg	aggtgttgct	gaccggcagg	10800
atttcggtgc	ggacgcatcc	gtggctggcc	gaacaccggg	tgctgggtga	agtgatcggt	10860
gcgggcaccg	cgttgctgga	gatcgccctg	cacgcggggg	aacgtcttg	ttgtgaacgg	10920
gtggaagagc	tcaccctgga	agcaccgctg	gtcctgccgg	agcgcggggc	gatccagggt	10980
cagctgcgag	tgggcgcgcc	cgagaattcc	ggacgcaggc	cgatggcgct	gtattcacgc	11040
cccgaagggg	cggcggagca	tgactggacg	cggcacgcca	cgggcccgtt	ggcggccaggc	11100
cgcggcgagg	cggctggaga	cctggccgac	tggccggctc	ctggcgcgct	gccggctcgac	11160
ctcgacgaat	tctatcgggg	cctcgagag	cttgggctgg	agtacggccc	gatcttccaa	11220
gggctcaagg	cggcctggcg	gcaaggggac	gaggtgtacg	ccgaagccgc	gctgccggga	11280
acggaagatt	ctggtttcgg	ggtgcatccg	gcaactgctg	acgcggctct	gcacgcaacg	11340
gctgtccgag	acatggatga	cgcacgcttg	ccgttccagt	gggaaggtgt	gtccctgcac	11400
gccaaaggcc	cgccggcttt	gcgggtccgc	gtggtcccgg	ctggtgacga	tgccaagtcc	11460
ctgctggttt	gtgatggcac	cggtcgaccg	gtgatctcgg	tggaccgact	cgtattgcgg	11520
tcggctgcgg	cccggcggac	cggtgccgcg	cgacaggccc	atcaagctcg	gttgtagccg	11580
ttgagctggc	caacggttca	actgccgaca	tccgctcagc	caccgtcctg	cgtgcttctc	11640
ggcacctcag	aagtgtccgc	tgacatacag	gtgtatccgg	acctccggct	gttgacggct	11700
gcgttggtat	ccggtgccga	accaccgggc	gtcgtcatcg	caccacgccc	ccccggcggg	11760
ggacgaacag	aggatgtccg	ggagacgact	cggcatcgac	tcgacctggt	acaaggctgg	11820
ctttccgata	cgcgactcaa	cgaatcccga	ttgctcctgg	tgacacaggg	agcagtgggc	11880
gtggagccgg	gcgaaccctg	gaccgatctg	gcgcaggccg	cgctctgggg	actgctgcgg	11940
tcgacgcaga	ccgaacaccc	tgatcgcttc	gtcctcgctg	atgtgcctga	gcccgcgcaa	12000
ctcctccccg	cgctgccggg	ggtgctggcc	tgcggcgaac	ctcagctcgc	gttgcgacgt	12060
ggcggcgctc	atgcgcccag	actggctgga	ctgggcagcg	atgacgtcct	gcccgtgccg	12120
gacggcaccg	ggtggcgatt	ggaggccacg	cgcccgggaa	gcctggatgg	gttggcattg	12180
gtggacgaac	cgacggccac	ggcaccgctg	ggtgacgggt	aggtcaggat	tgcgatgcgc	12240
gcggccgggg	tgaacttccg	ggatgcgctc	atcgcgctcg	gtatgtatcc	cgggtgtggc	12300
tcgctgggca	gtgagggcgc	cggggtcgtg	gtggagaccg	gccccggcgt	caccggcctg	12360
gcacccggcg	accgcgtgat	gggaatgatc	ccgaaggcgt	tcgggcccgt	cgcggtcgcc	12420
gaccatcgca	tgggtgacgag	gattcccgtc	ggttggagct	tcgcgcgggc	cgcacgggtg	12480
ccgatcgtct	ttctcacccg	ctactacgcg	ctggttgatc	tcgccggggt	gagaccaggg	12540
gagtcgttgc	tggttcattc	ggccgcgggt	ggggtgggga	tggccgcgat	ccaactcgcc	12600
aggcacctcg	gtgcagaggt	gtacgccacc	gctagcgagg	acaagtggca	agccgtggag	12660
ctgagccgag	aacacctcgc	ttcgtcgcg	acgtgcgatt	tcgagcagca	gttctctcgg	12720
gcaaccggcg	gacgcggcgt	cgacgtcgtg	ctcaactccc	tcgccgggga	gttcgccgat	12780
gcgtctctcg	gaatgctgcc	gcgcgggtgg	cgtttcctgg	agttggggaa	gacggatggt	12840
cgtgaccccg	tcgaggtcgc	cgatgcgcat	ccgggcgtgt	cttaccaggc	tttcgatacc	12900
gtagaggcag	gcccgcagcg	aatcggcgag	atgcttcacg	agctggtgga	gttggttcgag	12960
ggacgcgtgc	tggagcccct	gcctgtcacg	gcttgggacg	ttcggcaggc	gcccgaggcg	13020
ctacggcacc	tgagccaagc	gcggcatgtg	ggaaagctgg	tgctcaccat	gcctccgggtg	13080
tgggacgccg	caggcacggg	tctggttacc	ggcggaacgg	gagcacttgg	cgcagaggctc	13140
gcccggcacc	tcgtgatcga	gcgcgggggtg	cgaaacctgg	tcctcgctcag	caggcgcggt	13200
cccgagcca	gtggcgctgc	tgagctcgtg	gcgcaactga	cggcctacgg	tgccgagggt	13260
tccttgacag	cttgcgatgt	cgccgatcgt	gagaccttgg	cgaagggtgt	tgccagcatc	13320
ccggacgagc	atccggtgac	cgccgtgggtg	cacgcggctg	gtgttctcga	cgacggagtg	13380
tccgaatcgc	tcaccgtgga	gcggctggac	caggttctgc	gcccgaagggt	cgatggcgcg	13440
cggaatctgc	tcgagctgat	cgacccggac	gtggccctcg	tgttgttctc	gtcgggtgtcg	13500
ggtgtgctcg	gcagcgggtg	gcagggtaac	tacgcggcgg	ccaactcctt	cctcgacgca	13560
ttggcgagc	aaaggcagtc	gcgcggccta	ccgacgagat	cattggcctg	ggggccctgg	13620
gcggaacatg	gcatggccag	caccttgccg	gaagccgagc	aggatcgatt	ggcgcgatct	13680
gggttgctgc	cgatctcgac	cgaggagggg	ttgtcccagt	tcgacgccgc	gtgcggcggc	13740

gcgcataccg	tgggtggcgcc	ggttcgattc	agccgcttgt	ccgacgggaa	cgcgatcaag	13800
ttctccgtcc	tgcaaggttt	ggtcggggcc	catcgcgtca	acaaagcggc	gactgcggat	13860
gatgccgaga	gcctccggaa	acggttggga	cgcttgccgg	atgcagaaca	acatcggatt	13920
ctgctggacc	tcgtccgcat	gcatgtggcg	gcagtgtctg	gattcgcggg	ttctcaggag	13980
atcaccgcgg	acggcacggt	caaggtgctg	ggcttcgact	cgttgaccgt	ggtcgagttg	14040
cgcaaccgga	tcaacggggc	gacggggctg	cgactgcccg	ccaccctggt	gttcaactac	14100
ccgacgcggg	atgcgctcgc	cgcgcacctc	gtcaccgcgc	tgccgcgaga	ccgcctggcc	14160
gggacattcg	aggaactcga	caggtggggc	gcgaacctgc	ccacgctggc	cagggatgag	14220
gccacgcggg	cgagatcac	caccgcgcta	caggcgatct	tgacagcct	ggcggacgtg	14280
tccggcgga	ccggcgggcg	ctccgtgccg	gaccggctca	gatcggccac	ggacgacgag	14340
cttttccaac	tcctcgacaa	cgatctcgaa	cttccctgat	gcctcagccg	gagccttcgc	14400
aacttcctgg	agggaaacgc	cacatgtcga	atgaagagaa	gctccgggag	tacttgccgc	14460
gtgcgctcgt	ggatctgcac	caggcgcgcg	agcggctgca	cgaggcgagg	tcgggagagc	14520
gggaacccat	cgcgatcgtg	gcgatgggct	gccggatccc	gggtgggggtg	caggacccgg	14580
aagggctgtg	gaaactggtc	gcctccgggtg	gcgacgccat	cgggtgaattc	cccgtctgatc	14640
gtgggtggca	cctcgacgag	ctctacgatc	ccgacccgga	tcagcccgga	acctgctaca	14700
cccggcacgg	cggcttcctc	cacgacgcgc	gcgagttcga	cgcgggattc	ttcgacatca	14760
gcccccgtag	ggcgctcgcg	atggacccgc	agcagcggct	gctgctggaa	atctcctggg	14820
agaccgtcga	atccgctggg	atggacccga	ggtccttgcg	ggggagccgc	accgggggtgt	14880
tcgcgggatt	gatgtacgag	ggctatgaca	ccggcgccca	ccgggcagga	gaaggtgtcg	14940
aaggctatct	cggaaccggc	aatgcgggaa	gcgtcgccctc	tggtcggggt	gcgtatgcgt	15000
tcgggttcga	gggcccagcg	gtgacggtag	acacggcgctg	ctcgtcgtcg	ttggtggcgc	15060
tgcatattggc	gtgtcagtcg	ttgcggcagg	gcgagtgatga	tctggcgctg	gccgggtggag	15120
tgacgggtgat	gtcgacgcgc	gagaggttcg	tggagttctc	ccgtcagcgt	ggtctcgcac	15180
cggatggggc	gtgtaagtcg	ttcgcgggcg	ctcggtatgg	aaccggttgg	ggtgaggggtg	15240
ccgggtttgg	gttgctggag	cggctgtcag	acgccaggcg	gaacgggcat	cgggtatctg	15300
cgggttgctc	tggtagcgcg	gtgaatcagg	acgggtgcgtc	gaacggattg	acggccccga	15360
acgggctggc	ccaggagcgg	gtcattcagc	aggtgctcac	gagtgcgggg	ctgtcggcgt	15420
ccgatgtgga	cgctgtggag	gcgcatggaa	cgggtacgcg	gcttggtgat	ccgatcgagg	15480
cgcaggctct	gatagccgcc	tatggacagg	atcgggaccg	ggaccggccg	ctgtgggttg	15540
ggtcgggtcaa	gtccaacatc	ggtcatacgc	aggcggctgc	gggcgtcgct	ggtgtgatca	15600
agatgggtcat	ggcgatgcgg	cacggggagc	tgccgcgcac	gttgacagtg	gacgagccga	15660
attcgcacgt	ggactggctg	gctgggtgcg	tccgactcct	gaccgagaac	atccgctggc	15720
cagggacggg	tacgcgccgc	gctggagtg	cgctgctcgg	ggtaagcgg	accaacgcac	15780
acgtcatcct	cgaacacgac	ccgctcgccg	tgaccgagaa	cgaggaagca	gcgcagtc	15840
cagcacctgg	gatcgtgccc	tgggcgttgt	ccgggcgggtc	gtcgacggcg	ctgcggggccc	15900
aggccgaacg	gctgcgcgag	ctgtgcgagc	agaccgatcc	cgaccccgctc	gatgtcgggt	15960
tctcactggc	cgccacgcgc	acggcttggg	agcaccgagc	gggtggtgctt	ggtcgggaca	16020
gcgctacgtt	gcgctccggg	cttggcgctt	ttgccagcgg	tgaaccagcg	gtcgatgtcg	16080
ttgaggggag	cgtcctggac	ggcgaggtcg	tcttcgtctt	ccccgggtcag	ggctggcagt	16140
gggcccggat	ggcagtcgac	ctgctggacg	cttcgccgac	gttcgcgcgc	cacatggacg	16200
agtgcgccac	cgcgctgcgg	aggtacgtgg	actggtcggt	ggtcgacgtg	ctgcgcggag	16260
cggagaactc	cccaccgctg	gaccgggtgg	acgtgctcca	gcccgcgtcc	ttcgcggtga	16320
tgggtgctcgt	cgccgaggtg	tggcgcttct	acggggtgag	gccggcgggc	gtcgtcgggc	16380
acagtcaagg	cgaatcgcc	gcggcctgcg	cagccgggggt	gctgccgctg	gaggatgcgg	16440
ccaggcttgt	cgcattgcgc	agcagagcgt	tgaagggaact	ttcgggggcg	ggtggcatgg	16500
cgtcgctggc	ctgccttcgc	gatgaggtcg	cggcattggt	cgcgggatcg	ggcgcccgctc	16560
tggaaagtgc	ggcgatcaac	ggcccgcgat	cggctcggtg	gtccggcgat	ctggaagcgg	16620
tggacgaact	gctggcagag	tgcgctgaaa	aggacatgcg	tgacgcgcgt	atccccgctc	16680
actacgcctc	gcattcagcg	cacgtggagg	tggttcggag	cccgggtgctg	gcggccgcgc	16740
ccgggggtgc	acaccgggac	ggccaggtgc	cgtgggtggtc	gacggtgatc	ggcgactggg	16800
tggatccggc	caggctggac	ggcgagtatt	ggtatcgga	cctccggcag	ccggtccgg	16860
tcgaacacgc	cgtgcagggc	ctggctcgagc	ggggattcgg	cctgttcatc	gaaatgagtg	16920
cgcacccggt	gctgaccacg	gcggctcgagg	aaaccgggtgc	ggagtcggag	accgccgtgg	16980
ccgcggtagg	taccttgcca	cgtgactcgg	gcggcctccg	gaggttggtg	cattcgctgg	17040
ccgaggcgta	cgtgcgcggc	gccaccgtgg	actgggcccgt	ggcggttcggg	ggcgcgggcc	17100
gacggctgga	cctgcgcgac	taccggttcc	agcgcacagc	gtactggctg	gacaagggag	17160

ctgcctccga	cgaggctcgt	gcggtctcgg	acccggcggc	gggctggttc	tggcaagccg	17220
tggcgcgcca	agacctgaaa	agcgtgtccg	atgccctcga	tctcgacgcc	gacgcaccgc	17280
tgagcgcaac	acttccagcc	ctgtccgtct	ggcaccgtca	ggaacgagaa	agggctcttg	17340
cagacggttg	gcggtaccga	gtcgactggg	tacgggtggc	cccgcagccg	gtccggagaa	17400
cgcgggaaac	ctggctcctg	gtcgttcccc	cgggcggcat	cgaggaagcg	ctggtcgaac	17460
ggctgacgga	tgcgttgaac	acgcgagggg	tcagcaccct	gcgcctcgac	gtgccaccgg	17520
cggcgaccag	tggcgaactc	gcaaccgaac	tccgcgcgcg	agccgacggt	gacccggtga	17580
aggcaatcct	gtcgctcacc	gcgttggacg	agcgacccca	ccccgaatgc	aaggacgtcc	17640
cgagcgggat	tgccttgctg	ctgaacctgg	tcaaggcgct	cggatgaagcc	gacctcagaa	17700
ttcctctgtg	gaccatcacg	cgtgggtcgg	tcaaggcagg	ccccgcagat	cggctgctgc	17760
gcccgatgca	ggcgcaagca	tggggctcgg	ggcgagtagc	cgcactcgaa	caccccgagc	17820
gctgggggtg	gctgatcgac	ctgccggatt	cgtcggacgg	cgacgtcctc	acgaggctgg	17880
gcgaagcgct	caccaacggc	ttggcggaag	accaactggc	gattcgccag	tcgggctgct	17940
tggcccgggc	actggtaccc	gccccggcga	atcagccccg	tggacgtaag	tggcgcccc	18000
gagggagcgc	gctgatcacg	ggcggactcg	gcgcggtggg	cgcacaggtg	gcgaggtgg	18060
tggccgaaat	cggagccgag	cgaatcgtgc	tcaccagtcg	acggggcaac	caagcagcag	18120
gcgcgcgccg	gctggaagcc	gaactccggg	cccttggagc	gcaagtgtcc	atcgtggctt	18180
gcgacgtgac	cgatcgtgcc	gagatgtccg	cactactggc	cgagttcgac	gtcaccgcgg	18240
tgttccacgc	ggcgggagtc	ggtcggctgc	tgcggttggc	ggagaccgac	cagaacggcc	18300
tggccgaaat	atgcgcggcg	aaggtccgcg	gcgctcaggt	gctggacgaa	ctgtgcgaca	18360
gcaccgatct	cgatgccttc	gtcctgttct	cctcgggtgc	cggggtatgg	ggcggggggc	18420
gtcagggcgc	ttacggcgcg	gcgaacgcct	tcttggacac	actcgccgaa	caacgccgag	18480
cacgcggtct	gccggcaacc	tcgatctcct	ggggcagttg	ggccggcggc	ggcatggccg	18540
acggcgcggc	ggggaacac	ctgcggcgac	gcgggatacg	tcgatgccg	gcggcgctcg	18600
ccatcctggc	tctgcaggaa	gtacttgacc	aggatgagac	gtgcgtgtcg	atcgtctgat	18660
tgactctggg	ccgattcggt	cccacgttcg	ccgcgactcg	cgccaccggg	ttgttcgacg	18720
aagtgcgggc	ggcgagaaag	gcgatgcccc	cgaatggggc	ggcagaacca	ggcggtcgcg	18780
cgttcgcccc	caatctcgcg	gagctgccgg	aagcccaacg	acgccacgaa	ctgggtggatc	18840
tgggtgtgcg	ccaggtggca	accgtgctcg	ggcacggcag	tcgcgaggaa	gtccagcccc	18900
agcgggctgt	ccgcgcgctc	gggttcgact	ccctcatggc	ggtggatctg	cgcaatcggt	18960
tgaccaccgc	caccgggttg	cgctgcccga	ccacaaccgt	cttcgactac	ccgaatccgg	19020
ccgccttggc	cgctcacctg	ctcgaggagc	tgggtgggtga	tgtcgcgtcg	gctgcgggtga	19080
ccgctgccag	cgcgcgcccg	agtgcgaac	cgatcgcgat	cgtcgcgatg	agctgccggg	19140
ttccgggtgg	cgcgcactcg	ccggaagacc	tgtggcggct	ggtcgcgcc	ggcacggagg	19200
tgatcggcga	gttccccctc	gaccggggct	gggatgcgga	aggcctttac	gatccggatg	19260
cttccaggcc	tggaaacgacg	tatgcgcgga	tggcgggatt	cctctacgac	gccgggtgagt	19320
tcgatgccga	cctgttcggc	atcagccac	gtgaggcggt	ggcgatggat	ccgcagcagc	19380
ggttgggtgct	cgaatcgcc	tgggaagccc	tcgaacgggc	cggaaatcgat	ccgttgtcct	19440
tgaagggcag	tggggtcggc	acgtacatcg	gcgctggaag	ccgtgggtac	gcgacggatg	19500
tgcggcagtt	tcccaggagg	gcggagggtc	acctgctgac	gggtacctcg	gccagtgtgc	19560
tgtcgggtcg	ggtcgcgtat	tcgtttgggt	tcgagggtcc	tgcggtgacg	gtggatacgg	19620
cttgttcgct	gtcgttgggt	gcgttgcatc	tggcgtgcca	gtcgttgctg	tcgggcgagt	19680
gtgatctggc	gttgccgggt	ggtgtgaccc	tgatgtcgac	gccggagatg	ttcgtggagt	19740
tctcccgtca	gcgcgggttg	gcgcgggatg	ggcgggtgcaa	gtcgttcgcg	gagagcgcgg	19800
acggcaccgg	ctggggcgaa	ggcgcggggc	tgttgttgct	ggagcggttg	tcggacgccc	19860
accggaatgg	gcacggggtg	ttggcggtgg	ttcgtgggtc	agcgggtgaat	caggacggcg	19920
cctcgaacgg	actggcgggc	ccgaacggct	cgtcgcagca	gcgggtgatc	aaccaggcac	19980
tcgcgaatgc	ggctctttcg	gcgtccgatg	tggatgcggg	ggaggcacat	ggcacccggg	20040
ccaggctggg	tgatccgatc	gaggcgcagg	cattgatcgc	aacgtatggg	caggccccgg	20100
agcgggatcg	gcccttgttg	ctggggctcg	tcaagtcgaa	catcggtcat	acgcaggccg	20160
cggcggggtg	tgcgggtgtg	atcaagatgg	tgatggccat	gcggcacggg	cagctgcccg	20220
cctcgctgca	cgcggatgag	cccacgtcgg	aggctcgatt	gtcgtcgggg	gcggtcgggc	20280
tcctcgccga	acaggtacct	tggccggagt	ctgaccgtgt	tcgtcgggtg	ggggtttcgt	20340
cgttcgggat	cagcggcacc	aacgcacatg	tgatcctcga	acaagctacg	aatgcgccag	20400
atagtacagc	ggagacggac	aaaacagaat	ccgatcttac	tgtcgatatt	ccggtcgttc	20460
cctggttggt	gtcgggaaaag	acgacggatt	ccctgcgggg	acaagccgaa	cgagtcttgt	20520
ctcaggctga	gtcccggccg	gagcagcgtt	cgtcggatgt	tgcctactcg	cttgcttctg	20580

gccgagccgc	gctggatgaa	cgcgctgtcg	tgctgggtgc	ggaccgcggt	gagctgggtg	20640
ctggactggc	ggcgttggcc	gccggtcagg	aggettcctg	ggtgatcagc	ggaactcgtg	20700
cttctgctcg	gttcgggttc	gtgttcctcg	ggcaggggtg	tcagtgggtg	gggatgggca	20760
gagcgctcta	ctcgaagttt	ccggtgttcg	ctgctgcgtt	tgatgaggct	tcgcgccagt	20820
tggaggcaca	tctgggggaa	gaccgcgggg	ttcgggatgt	ggtcttcggt	tccgatgcgc	20880
agctgctgga	tcagacgctg	tgggcgcagt	cgggtctgtt	cgcgctgcaa	gccggcctct	20940
tggggctgct	gggttcgtgg	ggcgttcggc	cggatgtggt	gatggggcat	tcggtcgggg	21000
agttggccgc	cgcgtttgcg	gctggcgtgt	tgtcgttgcg	ggatgcggct	cggttggtgg	21060
ccgcgcgcgc	ccggttgatg	caagccctgc	cctctgacgg	cgcgatgttg	gcggtggctg	21120
ctggtgaaga	ccttggttcg	ccattgctgg	ccggtcggga	ggagtccgtg	agcgtcgccg	21180
cgctcaatgc	ccccggttcg	gtggtgttgt	cgggcgatcg	ggaggtgctg	gccagcatcg	21240
tcggccggct	gaccgagctc	cgagtcggga	cgcggcgctt	gcgggtctcc	catgcttttc	21300
attcgacccg	gatggacccg	atgttggggc	agttcgccca	gatcgccgag	tctgcggagt	21360
tcggtaagcc	aacgacaccg	cttgtgtcga	cgttgacggg	tgagctcgac	agagccgcgg	21420
aaatgagcac	accaggggat	tgggtgcgcc	aggcgcgtga	accgctccgt	ttcgccgacg	21480
gtgtccaggc	cctggcagcg	cagggcatag	gcacggtcgt	cgagctcggc	ccggacggaa	21540
cgctggcggc	actggttcgg	gagtgtgcga	ccgagtcgga	tcgggttggg	cggatttcgt	21600
cgatcccact	gatgcgcagg	gagcgggacg	agaccggttc	ggtgatgaca	gccctggcgc	21660
atctccacac	ccgtggtggt	gaggtggact	ggcaggcggt	tttcgcgggt	accggcgcta	21720
ggcagctcga	gttgccaacg	tatgccttcc	aacgacagca	ctactggatc	gagtcagggt	21780
cgcggccagc	acgcgacccg	gcagacatcg	gcgaggtggc	ggaacagttc	tggaccgcgg	21840
ttgaccaagg	cgatctggca	acgttggtcg	ccgctctgga	tcttggggcg	gacgacgaca	21900
catgcgcctc	gttgagcgat	gtattgccgg	cgttgtctct	ctggcgaagc	ggactccgca	21960
accgttcgct	cgtcgattcc	tgccgggtacc	gaatcagttg	gcattcctct	cgggaggtgc	22020
cggccccgaa	gatttcgggt	acctggctgt	tggtcgtgcc	cgggtcgtcg	gatgacggat	22080
tggtcacggc	tttgacgagt	tcactggctg	gagggcgccg	cgaggtcgtc	cggatcgccc	22140
tgtccgaaga	ggaccgcgac	cgcgaggacg	tcgcacagcg	gctggccaat	gcgctgacgg	22200
atgccggtca	actcgggtgg	gtgctttcgc	tgttggggct	cgatgaatcg	cctgctccgg	22260
gatttctctg	cttgccaact	ggtttcgcgc	tgactgtgca	gcttctgcgg	gccttgcgga	22320
aggccgacgt	cgaggcgctt	ttttggggcg	tgacgcgcgg	cggcgtcgcg	ttggaagatg	22380
tacgcgtgtc	tccggagcag	gccctggtct	gggggctgct	gcgtgtcgcg	ggactggagc	22440
accgggagtt	ctgggggtgg	ttgatcgacc	tgccatcgga	ctgggacgac	cgattgggtg	22500
cccggttggc	gggtgtgttg	gcggatggtg	gcgaggatca	agtcgccatt	cgccgtggtg	22560
gtgtgttcgt	gcggcggttg	gaacgcgctg	gtgcgtcggg	tgccgggtcg	gtgtggcgct	22620
ctcgggggac	ggtgttggtg	acgggtggta	cgggcggttt	gggggcgcat	gttgcccggg	22680
ggttggccgg	tgccggggct	gagcacgtgg	tgttgaccag	ccgtcgagga	gcggacgctc	22740
cgggcgctgg	ggaattgcgg	gcggagctgg	aggcgctggg	tgctcgggtg	tcgatttgtc	22800
cctgcgacgt	ggctgatcgt	gacgcagtgg	ctggagtgtt	ggcagggatc	ggtggggagt	22860
gtccgctgac	tgcggtggta	cacgcgcggc	gggtcggcga	ggcggggcag	gtagtggaga	22920
tgggtttggc	ggattttgca	gcggtgttgt	cggcgaaggt	gcgtggtgcg	gcgaatctgg	22980
acgagttgct	ggccgactcg	gagctggatg	cgtttgtgat	gttctcctcg	gtgtcggggg	23040
tgtggggagc	cggcggacag	ggtgcgtatg	cggctcgcaa	cgctaacttg	gatgcgttgg	23100
ccgagcagcg	tcgggcgagg	ggattggtcg	ggaccgcggt	tgctggggga	ccgtggggcg	23160
gtgacggcat	ggccgcgggc	gaaaccggcg	cacagctgca	ccggatgggc	ctggcgctga	23220
tggaaccgag	cgcggcgctg	ctggcacttc	agggtgcatt	ggaccgcgat	gagacctccc	23280
tcgtcgtggc	cgatgtcgat	tgggcacggt	tcgccccagc	cttcacctcg	gcacgtcgac	23340
gcccgtgctg	ggacaccatc	gacgaggccc	gagccgcatt	ggaaaccacc	ggcgaacaag	23400
cgggcacagg	caaaccctgt	gagctgacgc	aacgcctggc	cggactgtcg	cggaaaggaa	23460
gcgacgatgc	ggtattggat	ctggtgcggg	cggagacggc	ggctgtgctg	ggacgcgacg	23520
atgccacggc	cctggcgcca	tcgcggccgt	tccaggaact	cggattcgac	tccttgatgg	23580
cgggtggagct	gcgcaaccgg	ctgaacaccg	ccaccgggat	ccagctgccc	gccagcacga	23640
ttttcgacta	ccccaatgcc	gagtcgctgt	cgcgtcacct	ctgcgccgag	cttttcccaa	23700
cggagactac	cgtggactcg	gcccttgccg	agctcgatcg	aatcgagcag	cagctctcga	23760
tgctcaccgg	cgaagcgcg	gcacgggacc	gaatcgcgac	acgactgcga	gccctccacg	23820
agaagtggaa	cagcgcagct	gaagtaccga	cggagccgga	tgctcctgagc	acgctcgatt	23880
cggcgacgca	cgacgagata	ttcgagttca	tcgacaacga	gctcgacctg	tcctgagcag	23940
ttcctgcgga	acttcaagcg	ccgaaatcgg	gtggaaatca	caatggccaa	tgaagaaaag	24000

ctcttcggct	atctgaagaa	ggtaactgcg	gacctgcata	agacccggca	gcgcctgctc	24060
gcggccgaga	gccggagtc	ggagccgate	gcgatcgtct	cggcgagctg	ccgactgccc	24120
ggcgccgctc	actctcccga	agcgtctctg	caactcgtgc	gcactggcac	cgacgccatc	24180
tcggagttcc	ccgccgaccg	gggctgggat	ctcgcccggt	tgtacgatcc	cgacccgaac	24240
caccagggaa	cgtcgtacac	gcgggcccgc	ggtttcctcg	caggagcggg	cgatttcgac	24300
cccgccatgt	tcgggatttc	gccgcgtgag	gcgttggcga	tggacccgca	gcaacggttg	24360
ttgctggagc	tgtcctggga	ggccctcgaa	cgggcgggca	tagacccgac	atccctgccc	24420
ggcagcaaga	ccggtgtctt	cggtggtgtc	acgccccagg	agtacgggcc	gtccttgcat	24480
gagatgagcc	gaaacgctgg	gggttttgga	ctcaccgggc	ggatggtgag	tgtggcgctg	24540
ggtcgggttg	cgtattcggt	tggttttgag	ggtcctgcgg	tgacggtgga	tacggcggtg	24600
tcgtcgctgt	tgggtggcct	gcatttggtg	tgtcagtcgt	tgcgttcggg	cgaatgcgat	24660
ctcgcgctgg	ccggcggtgt	gacggtgatg	gcgacaccgg	cgacgttcgt	ggagtctctc	24720
cgtcagcgtg	gtttggctcc	ggacgggcgg	tgcaagtctg	tcggcgctgc	cgcggtatgg	24780
accgggtggg	gtgagggtgc	cggtctgggt	ttgctggagc	ggttgtcgga	tcgcggcgcg	24840
aatgggcacg	aggttctggc	ggtaggtgcg	ggtagcgcgg	tgaaccagga	cggcgcgtcg	24900
aatggtttga	ctgcgccgaa	tggtccgtcg	cagcagcggg	tgatcaccca	ggcgttggcg	24960
agtgcggggc	tgtcgggttc	cgatgtggat	gcggtcgagg	cacatgggac	cgggaccacg	25020
ttgggtgatc	cgatcgaggc	acaggccctg	atcgccacgt	acgggcaggg	ccgggagaag	25080
gatcgcccg	tgtggttggg	gtcggtcagg	tccaacatcg	gtcacacgca	ggcggccgct	25140
ggcgttgccg	gcgtcatcaa	gatggtcttg	gcgatgcggc	acgggcagct	gcccggccacg	25200
ttgcatgtgg	atgagcccac	gtcggcggtg	gactggtcgg	cggttctcgt	ccggtctctc	25260
acggagaaca	cgccctggcc	ggacagtggg	cgtccttgcc	gggtgggggt	gtcgtcgttc	25320
gggatcagcg	gcaccaacgc	acatgtgatt	ctcgaacagt	ctccagtcga	gcagggcgaa	25380
ccggccgggc	cggtcgaagg	cgagcgggaa	ccggatgtag	ccgtccccgt	ggtgccttgg	25440
gtgctgtcgg	gtaagacacc	ggaggctgcg	cgggcgcagg	ccgaacgggt	gcattcgcat	25500
atcgaggacc	ggccgggctc	gtcgcgggtg	gatgtggcgt	attcgctagg	aatgacacgc	25560
gcggcgctgg	atgaacgcgc	agtgggtgtg	ggctcggacc	gtgccgcgct	cctgaccggg	25620
ttgagggcat	tcgccgacgg	ctgcgatgcg	cccgaagtgg	tttcgggggt	tgtggggcct	25680
gggtggcccg	tcgggttcgt	gttctcgggt	cagggtgggt	agtggccggg	gatgggcccg	25740
gggctctact	cggtgtttcc	gggtgttcgc	gacgcgttcg	acgaggcttg	cgcgaggttg	25800
gatgcacacc	tgggcccagga	actgcgggtt	cgggatgtgg	tgttcggttc	gcaagcgtgg	25860
ttgctggatc	ggacggtgtg	ggcgagtcg	ggtttgttcg	cgttgcagat	tggcttgctg	25920
cggtctgctg	gttcgtgggg	tgttcggccg	gatgtgggtg	tggggcactc	ggtgggtgag	25980
ctggctgcgg	tgcagtcggc	tgggtgtgtg	tcgttgtcgg	aggccgcgcg	ggttggtggc	26040
ggtcgcgccc	ggttgatgca	ggcgttgcc	tctggtgggt	ccatgctcgc	ggtcgctacg	26100
ggtagatttc	aggtcgatcc	tctgctggat	ggggtgcggg	accggatcgg	tatcgcgggc	26160
gtgaatggcc	cggaatcggg	tgtgctctct	ggtgaccgcg	agctgctcac	cgagatcgct	26220
gatcgggttc	acgatcaggg	gtgccggacc	cggtggttgc	gggtgtcgca	tgctttccat	26280
tcgccccata	tggagccgat	gctggaggag	ttcgcccaga	tctcccaggg	ccgcgaatat	26340
cacgcaccgg	aactgccgat	catctcgacc	ctgatcgggt	agctggacgg	tggtcgagtg	26400
atgggcactc	ccgagtactg	ggtgcgtcag	gtgcgtgagc	ccgtccgttt	cgccgagggt	26460
gtccaggcgc	ttgtcgggtc	gggtgtcggc	acgattgtcg	aattgggtcc	ggacggggcg	26520
ttgtcgacgt	tggtcgagga	gtgtgtggcg	gaatccgggc	gggtggccgg	gatcccgctg	26580
atgcgcaagg	accgcgacga	ggcgcgaaac	gtgctggcag	ctttggcgca	gatccacacc	26640
cgtggtgggt	aggtggactg	gcggtcgttt	ttcgccggta	ccggggcgaa	gcaagtcgac	26700
ctgcccacct	acgccttcca	gcggcagcgg	tactggctgg	catccaccgg	gcgtgcggtg	26760
gacgtgaccg	ccgccggatt	ggccgaggcg	gaccatccgc	tgctcggtgc	ggtggttgcg	26820
ttggcagacg	gcgaagggtg	ggtgctgacc	ggtcggttga	cagcgggttc	gcatccgtgg	26880
ttgtccgate	accgggtgct	gggcgaaatc	gtcgtccccg	gcaccgcgat	cgtcgagctg	26940
gtgtggcacg	tcggcgagcg	cctcggttgt	ggccgggtgg	aagaactggc	tttgggaagc	27000
cccctgatcc	tgccggatca	tggagcgggt	cagggttcagg	tgctgggtgg	accgcccggg	27060
gaatccggag	cccggtcggg	ggcgctctac	tccgtgcctg	gcgaggcgat	cgaacccgag	27120
tggaagaagc	acgcgacggg	cgtgcttctc	ccaccctggt	ccgccgagaa	ccatgagctg	27180
accgcatggc	ccccggagaa	tgcgaccgaa	atcgatgcag	acggggtcta	cgcattcctt	27240
gaagggcacg	gtttcgcgta	cggaccggcc	tttagatgtc	tcgcgggtgc	ctggcgacga	27300
ggcggggagg	tgttcgccga	agtgcgattg	ccggatgaca	tgacggcggg	ggtcgatcga	27360
ttcggcgtcc	accccgcggt	gctggacgcg	gttctgcatg	ccgccgcagc	cgagacgtcg	27420

gtggtccaga	gcgaagcgcg	ggtgccgttc	tcgtagcggtg	gggtggaact	tcgcgccact	27480
gaaagcgcg	tggtgcgggc	gcgcctctcg	ttgacttcgg	atgacgaact	gtcgttggtc	27540
gcagtggacc	cggtcgccg	attcgtaggc	acggttgatt	cgctggtagc	ccgaccgatc	27600
tcgccgcagc	aggtgaggtc	tggcgcgatc	ggtgattgcc	tgttcgaggt	ggagtggcac	27660
cggaaggcgt	tggtgggaac	aaccgcccgc	gacgaccttg	ccatcgtcgg	tgacggtccc	27720
agttggccgg	aatcggtgcg	cgcaaccgca	cggttcgcg	ccctggatga	gttcggtgcg	27780
gccgtggact	cggacgttcc	tgccccgggt	tccgtgttgg	tcgcagctat	gtcggccgaa	27840
gaggtcgagg	gtggatccct	gccgtcgcg	gcccagaggt	cgacctccga	tctgctggct	27900
ctcgtagcgt	cgtggcttgc	ggacgagcgg	ttcgccgaat	cccagctcgt	ggtcgtcacg	27960
cgtgcagcgg	tgtagggcga	ctcggttgcg	gacgtcgcg	acctgggtggg	tgctgctgctg	28020
tggtgggtgt	tgagttcagc	ccagtcggag	aaccgggttc	gcttcgtgct	ggtggacgtg	28080
gacggcacac	ctgagtcgtg	gcaggcgttg	ccggcgccg	tgcgagcagg	agaaccgcag	28140
ctggcacttc	ggcgcggtcg	ggcgctgggtg	cctcggttgg	cgcgactcac	ggtgcgcgag	28200
gagggctcct	ccccgcaact	cgacacggac	gggaccgtcc	tcatcacggg	tggcaccggt	28260
gcgttggggg	gagtggttgc	ccgtcacctg	gtggaggagc	acgggattcg	gcgtttggtg	28320
ttggcaggcc	ggcgtaggtg	gaatgcgcct	ggagtccacg	agttggtgga	tgagctggcg	28380
cgcgcgggcg	ccgtggttga	ggtggtggct	tgcatgttgg	ctgaccgcac	cgatctggag	28440
cacgtgctgg	ccgccattcc	ggtcgactgg	ccgctgcggg	ggatcgtgca	taccgctggg	28500
gtgctggccg	acggagtgat	cggttccttg	tcggcgccgg	atgtgggcac	ggtgtttgcc	28560
ccgaaggtga	cgggggcatg	gcattctgcac	gagttgacct	gcgatctgga	tctgtcgttc	28620
ttcgttcttt	tctcttccct	ctccgggatt	gcggtgccc	cagggcaggc	caactacgcg	28680
gcggcgaaaca	cgttccttga	tgcatgtggc	cgttatcgcc	ggcgcggtgg	gctgcctggg	28740
ttgtcgttgg	cgtggggact	gtgggcgcaa	cccagcggta	tgacgagtg	cttgagcgcg	28800
gcgtcggtgg	agcgggttggc	gcggacgggc	atcgcaaac	tttccacgga	ggatggactc	28860
cgctggttcg	atgcccggtt	cgcgaggac	cgggttgctg	tcgttgccgc	tcgattggac	28920
aggcgctcgc	tgtaggggaa	cggacgatcg	cacgcgattc	cggcgctgtt	gagcgcgttg	28980
gttcctgttc	gcggcggtgt	ggcgaggaaa	acagccaatt	ctcaggccgc	ggatgaggac	29040
gcactgttgg	gtttggtgcg	ggagcacgtt	tcggcgctgc	tggtttattc	gggtgcggtc	29100
gaggttgggg	gcgaccgtgc	tttccgtgat	ctgggttttg	attcgttgtc	tggcgtaggag	29160
ttgcggaacc	gccttgccgg	ggtgctgggg	gtgcggttgc	cggcgactgc	ggtgttcgac	29220
tatccgacgc	cgccggcgct	ggcgcggttc	ctgcatcagg	aactggcagg	cgaggtcgcg	29280
tcacacgtcg	cgccggtgac	cagggcagcg	agtgcgaag	aggatcttgt	tgcatgtgtc	29340
gggatgggat	gtcgttttcc	gggtgggggtg	tcgtcgccgg	aggagctttg	gcggctgggtg	29400
gccggcgccg	tggatgcggt	ggctgggttc	ccagacgatc	gcggctggga	tctcgccggc	29460
ttgtacgatc	ctgatcccga	tcgtctcggg	acctcgtag	tgtgtgaggg	cgggtttctg	29520
cgggacgcgg	cggagttcga	tgctgacatg	ttcgccatca	gcccgcgtga	ggcgttggcg	29580
atggatccgc	agcagcggtt	gctgctggag	gtcgccctggg	aaaccttgga	gcgggctggg	29640
atcgatccgt	tctcgttgca	cggcagccgg	accggtgtgt	tcgcgggctt	gatgtaccac	29700
gactatgggg	cccgattcat	taccagagca	cggagggtct	tcgaagggca	cctcgggacg	29760
ggcaatgcgg	ggagcgtgct	gtcgggtcgg	gttgcgattt	cgtttggttt	cgagggtcct	29820
gcggtgacgg	tggatacggc	gtgttcgtcg	tcgttggtgg	cgttacacct	ggcgggtcaa	29880
gcactgcggg	cgggtgagtg	cgaattcgcc	cctgcccgtg	gcgtcacggt	gatgtcgacg	29940
ccgacgacgt	tcgtggagtt	ctcccgctca	cggggtctgg	ctccggatgg	gcgggtgcaag	30000
tcgttcgcgg	cggccgcgga	tggcacccggg	tggggcgagg	gtgccggtct	ggtgttgctg	30060
gagcggttgt	cggatgccc	gcgcaatggg	cacgaggttc	tgccggtggt	gcggggtagc	30120
gcggtgaacc	aggacggcgc	gtcgaatggc	ttgactgcgc	caaattggtcc	gtcacagcaa	30180
aggggtgatca	cccaggcact	cacgagtgcc	gggctgtccg	tgctccgacgt	ggatgctgtg	30240
gagggcgatg	ggacgggcac	gcggcttggt	gatccgatcg	aggcgaggc	ggtgatcgct	30300
acgtacggcc	gggatcgtga	tcgccggtcg	ccgttgtggc	tggggtcggt	gaagtccaat	30360
attggtcaca	cccaggcggc	ggcggtgtgc	gctggtgtga	tcaagatggt	gatggcgatg	30420
cggcaggggg	agctgccgcg	cacgttgcac	gtggacgagc	cctccgcgca	ggtggactgg	30480
tctgccccga	cgggtccaact	cctcacggag	aacacgccct	ggcccgcag	cggctcgtctt	30540
cgcggggcgg	gcgtgtcatc	gttcgggatc	agtggcacca	acgcgcacct	gacccctgaa	30600
caacctccgc	gagagtcgca	gcgtcaaca	gagccggtt	cgggttctgt	ccgcgatttt	30660
ccggtggtgc	cgtggatggg	gtcgggcaaa	acacccgaag	cgctatccgc	ccaggcagat	30720
gcattgatgt	cctacttgag	caatcgcggt	gatgcttccc	cgcgagatat	cggttattcg	30780
cttgcggtga	cccgctccggc	gttggaccac	cgcgctgtcg	tgctgggtgc	ggatcgtgcc	30840

gcgttgctgc	cgggcttgaa	agcgctggcc	gttagtaatg	acgctgccga	ggtgatcacc	30900
ggcaactcgtg	ccgctggggc	ggtcggattc	gtgttctccg	gtcaagggtg	tcagtggccc	30960
gggatgggaa	gcgggctcca	ctcggcgttt	ccggtgttcg	ccgacgcgtt	tgacgaagcc	31020
tgctgcgagc	tggatgcgca	tctcgggcag	atggcccggc	tacgagatgt	gttgtccggt	31080
tcggatacgc	aacttctgga	ccagaccttg	tgggcgcagc	cgggcctggt	cgcgttgcaa	31140
gtcggactct	gggagttggt	gggttcgtgg	ggtgtccggc	ccgctgtggt	gctggggccac	31200
tcggtcgggtg	agctggcggc	ggcgttcgcg	gctggagtg	tgctcgttcg	ggatgcggct	31260
cggctgggtg	cgggcctg	ccggttgatg	caagccctgc	caactggcgg	tgccatgctc	31320
gctgcggctg	ctggagagga	gcagctgcgc	ccgttgctgg	ccgactgcgg	tgatcgtgtg	31380
gggatcgccg	cggccaacgc	tcccgggtcg	gtggtgctct	ccggtgatcg	ggatgtgctc	31440
gatgacattg	ccggtcggct	ggacgggcaa	gggatccggt	ccaggtgggt	gcgggtttcg	31500
catgcgtttc	attcgcacgc	gatggatccg	atgctggcgg	agttcaccca	aatcgcccgg	31560
agcgtggact	accggctcgc	agggtgcgcg	atcgtgtcga	cgttgacggg	tgagctcgat	31620
gaggtcggca	tgccggctac	gccggagtat	tgggtgcgcc	agggtgcgaga	accgcctcgc	31680
ttcgcgcagc	gtgttgctgc	gctcgcggct	cacgggtgtga	gcaccgtcgt	cgaggctcgg	31740
ccggatgggg	tggttgctggc	gctggtgcag	gagtgccggc	ccggatccga	tcagggcgga	31800
cgggtggccg	cggttccgct	catgcgcagc	aatcgcgcag	aggcgcacac	ggtgacaacg	31860
gcattggcgc	agatccatgt	gcgtggtgct	gaggtggact	ggcggctcgt	tttcgcgggt	31920
accggggcaa	agcaggctga	gctgcccacg	tatgccttcc	aacgacagcg	gtactggctt	31980
gactcaccat	ccgaaccggg	cgggcaatcc	gccgatcccg	cgcgccagtc	gggcttctcg	32040
gaactcgtcg	agcaggaaga	tgtcagcgcg	ctcagcgcgc	ctctgcacat	taccggcgat	32100
cacgacgtgc	aggcgtccct	ggaatcgggtg	gttcgggtcc	tctcctcctg	gcategcggc	32160
atccgcaacg	aatccctggg	gcaccagtgg	cggatccgga	tttccctggc	tgagcgggca	32220
gatttgccag	acccctcgtt	gtcggggaca	tggctcgtcg	tcgtgccgga	ggggtggctg	32280
gcgttgccgc	aagttctgcg	tttcaacgag	atgttcgagg	aacgggggtg	cccggcagtt	32340
ctgttcgagc	tcgcggggca	cgcagaggaa	gccctggcgc	aacgattccg	ctcgttgctc	32400
gttgcgctcag	ggggaataag	cggcgtgttg	tccttgctgg	cgttggtatga	atcgccgtcc	32460
tcgccgaacg	ctgctttgcc	gaatggcgcg	ctgaactcgt	tggtaactgt	gcgagctctg	32520
cgggcgcggg	atgtgtcggc	gccattgtgg	ttggcgacgt	gtggtggtgt	cgcggctcgg	32580
gatgtgccgg	tgaaccgggg	gcaggcgcgt	gtgtggggac	tgggtcgcgt	cgtcggctctg	32640
gagcatccgg	cctgggtggg	tggcctgggtc	gacgtgccgt	gcttgctcga	tgaggacgct	32700
cgagaacgct	tgctcggctcgt	gttggcagggt	cttggcgagg	acgagatcgc	ggtacgtccc	32760
ggtggtgtgt	tcgtgcggcg	gttggaaocg	gctggtgcgg	cgtcgggtgc	cgggtcgggtg	32820
tggcgctcctc	gggggacggg	gttgggtgacg	ggtggtacgg	gcggtttggg	ggcgcatgtt	32880
gcccgggtggt	tggcgggtgc	cggggctgag	catgtggtgt	tgaccagccg	tcgaggcgcg	32940
gcggctccgg	gcgctggaga	tttgcgggcg	gagctggagg	cgtcgggcgc	tcgggtttcg	33000
atcacggcct	gcgacgtggc	cgatcgtgac	gctttggccg	aagtgttggc	gaccattccg	33060
gatgattgcc	cgtgaccgcg	ggtgatgcat	gcggcggggg	tcgttgaagt	cggcgacgtg	33120
gcgtcgatgt	gtttgaccga	cttcgttggg	gtgctgtcgg	cgaaggcagg	tgggtcggcg	33180
aatctcgatg	agttgctcgc	cgatgtcgag	ctggatgcct	tcgtgctggt	ctcatccgtc	33240
tcgggtgtgt	ggggtgctgg	cgggcagggc	gcttatgcgg	cggcgaatgc	ctacttggat	33300
gcgttgccgc	agcagcgtcg	ggcaaggggg	ttggtgggga	ctgcggttgc	gtggggcccg	33360
tgggcccggg	acggaatggc	cgcagggtgaa	ggcgggtgcac	agctgcgccg	ggccggcctg	33420
gtgccaatgg	ctgcggatcg	ggcgttgctg	gcacttcagg	gcgcattgga	tcgtgacgag	33480
acatccctgg	tcgtggccga	tatggcgtgg	gagagggttcg	ccccgggtgt	cgccatgtcc	33540
cgtcggcgctc	cgtgctcga	cgagctgccc	gaagcacagc	aggcgttggc	ggatgcggag	33600
aacaccactg	atgctgcgga	ctcggcgcgc	ccgctaccgc	ggctcgcggg	catggcagcc	33660
gccgaacgcc	gccgcgcgat	gctggacctg	gtgctggcgg	aggcctcgat	tgtgttggga	33720
cacaacgggt	ctgacccagt	tggccccgac	cgggcgttcc	aggagctcgg	atttgattcg	33780
ctgatggccg	tcgaactgcg	caacagggtg	ggcgaggcaa	caggattgag	tctgccggcc	33840
acgttgatct	tcgattatcc	gagcccatcc	gcgtggctg	agcagctggt	cggcgagctg	33900
gtgggagcgc	agcccgcgac	caccgtcgtg	gccggggccg	atccagtgga	tgatccgggt	33960
gtcgtggtcg	cgatgggatg	ccggtatccg	ggcgacgtct	gctcgcccga	ggagctgtgg	34020
cagctggttt	ctgcgggacg	tgatgcggta	tcgacgttcc	ccgtcgatcg	gggttgggac	34080
tgcaacacgt	tgttcgaccc	ggatccggat	cgggcaggca	gtacctatgt	gcgagaagggt	34140
gccttctctga	ccggtgctga	tcggttcgac	gccgggttct	tcggcatcag	ccctcgcgag	34200
gcgcgcgcaa	tggatccgca	gcagagggtg	ttgctcgaag	tggcgtggga	ggttttcgaa	34260

cgagcaggaa	tgcgtccgct	gtcgttgccg	ggtagcagga	cgggtgtgtt	cgcggggacc	34320
aatgggcagg	accaagggtgc	gaaagtggct	gccgcgcgg	aggcggcggg	tcacctcctg	34380
accggaaacg	ccgcgagtg	cctggccggc	cggcttctct	acacgttcgg	ccttgagggg	34440
cctgcggtgg	cgggtggatac	cgcgtgttcg	tgcgtgttg	tggcgttgca	tttggcgtgc	34500
cagtcgctgc	gttcgggtga	gtgtgatatg	gcgttgccag	gtggtgtgac	ggtgatgtcg	34560
acacccctgg	ctttcctcga	gttctctcgt	cagcgcgggt	tggcgccaga	tggtcgggtgc	34620
aagtcgtttg	cggccgctgc	ggatggcacc	gggtgggggtg	aggggtgccg	cctggtgttg	34680
ctggagcggg	tgtcggatgc	tgcgcggaat	ggtcaccggg	tgttgcccg	ggttcgcggg	34740
tctgcggtga	atcaggatgg	tgcgtcgaat	ggcctgactg	cgcggaatgg	tccgtcgcag	34800
cagcgggtga	ttcggcaggc	cctcgcgaat	gcggggctgt	cggcgtccga	tgtggatgtc	34860
gtggaggcgc	acgggaccgg	taccgggctc	ggggatccga	tcgaggcgca	ggcgtgatc	34920
gcgacatatg	ggcaggagcg	ggatcctgag	cgggccctgt	ggctgggggtc	gatcaagtcc	34980
aacatcgccc	acacgcaggc	ggcgccgggt	gtggcggggg	tcacgaagat	ggtgcaggcc	35040
atgcggcacg	gggagttgcc	tgcgacgttg	cacgtggaca	agccactcc	acaggtggac	35100
tggctctgcc	gggcccgttcg	gtcctcacc	gggaacacgc	cctggcccga	gagcggccgt	35160
cctcgtcgag	cgggggtgtc	gtcgttcggg	atcagcggca	ccaacgcaca	cctcatcctc	35220
gaacaaccac	cgtcggaaac	agcggagatc	gaccaatcgg	atcggcgggt	cactgcgcac	35280
ccagcgggtga	tcccgtggat	gttgctcggc	aggagtctcg	cagcgtcgca	ggcccaagcg	35340
gctgcgctgc	aggcccgggt	ggaccggggg	cctggcgctt	ctccgctgga	tttgggggat	35400
tcaactcgca	ccactcgttc	tgtgctggac	gaacgcgcg	tctgtgtggg	tgcgcatcg	35460
gaggcactgc	tgtccaggct	ggcagcgtc	gccgatggcc	ggacggcgcc	gggggtgata	35520
acgggctctg	cgaattccgg	tggccgcac	ggattcgttt	tttcgggtca	gggcagtcag	35580
tggctgggga	tgggaaaggc	gttgtgcgcg	gctttcccg	cgttcgcgga	cgccttcgag	35640
gaagcctgcg	acgcgctaag	cgcacacctg	ggcgcggacg	ttcgggggtg	gctgttcggg	35700
gctgatcgag	agatgctcga	cggagcgtg	tgggcgcagt	cggggatctt	cgcgggtcaa	35760
gtcggcctcc	tgggattgct	gaggctcgtg	ggcgtgcggc	cggccgcggg	gctggggcac	35820
tccgtcggcg	agttggctgc	ggcgcacgcg	gctggtgtgt	tgtccttgcc	ggacgctgca	35880
cggttggttg	cggctcgggc	ccacctgatg	caggcattgc	ccaccggcgg	cgcaatgtc	35940
gcggctcgca	ccagcgaggc	ggcggctcga	ccgctgcttt	ccgggggtgtg	cgatcgggtc	36000
agcatcgctg	cgatcaacgg	ccccgagtcg	gtagtgtctt	ccggcgaccg	cgatgtgtct	36060
gtggagctcg	caggcgaatt	cgatgcccg	gggcttagga	ccaaatgggt	gcgggtctcc	36120
catgctttcc	actcgcaccg	gatggaaccg	attctggacg	agtacgcgga	aaccgccagg	36180
tgcgtcgagt	tccgtgaacc	ggtggtgccg	atcgtctccg	ccgcgaccgg	tgcgctggac	36240
accaccggac	tgatgtgcgc	ggccgactac	tggacgcgcc	aagtgcgtga	tcctgtccgc	36300
ttcggagacg	gtgtccgggc	gctcgtcggc	caaggcgtgg	acacgatcgt	cgagttcggc	36360
ccggacgggg	cgttgtcggc	cctggtcgag	cagtgtcttg	ccgggtccga	ccaggctggg	36420
aggggtggcg	cgatcccgt	gatgcgcagg	gaccgcgatg	aggtcgagac	cgcgggtggc	36480
gccctggcgc	acgtgcacgt	ccgcgggtgt	gcgggtggact	ggtcggcttg	cttcgcgggc	36540
accggcgccc	gcaccgtcga	gttgcccacc	tacgccttcc	aacgccagcg	gtactggctg	36600
gccgggcaag	cggacggggc	cggcggcgat	gtggttgccg	accgggtcga	cgcgcgcttc	36660
tgggagttgg	tgcagcgcgc	cgatccggaa	ccgttggtgg	atgaactctg	catcgaccgg	36720
gaccagccct	tccgggaggt	gctgcccggt	ctggcttcc	ggcgcgagaa	acaacgccag	36780
gaggccctcg	cggattcctg	gcgctaccag	gtgcgctgga	ggtccgtcga	ggtgccgtcc	36840
gcagccgccc	tccggggcgt	gtggctgggtg	gtgcttccag	ctgacgtgcc	ccgagatcaa	36900
ccggcgggtcg	tcacgcagcg	gctgatcgcg	cgcggcgccg	aggtcgcggg	cctggaattg	36960
accgagcagg	acctccaacg	cagtgcgctt	gtggacaagg	tgcgcgccgt	cattgcggac	37020
cgcaccgagg	tgacgggtgt	gttgtctctg	ttggcgatgg	acggcatgcc	ctgcgcggcg	37080
catccgcacc	tgtcccgtgg	tgtcgcgcgt	accgtgatcc	tgacgcaggt	gttgggcatg	37140
gcgggtgttt	ccgccccgct	gtggctggcc	acgaccgggtg	gcgtcgaggc	cgggaccgag	37200
gacggtccgg	ccgatccgga	ccacggcttg	atctgggggc	tcggcagggg	cgtcggcctt	37260
gaacatccgc	agtgggtggg	tggcctgatc	gaccttccgg	agacactgga	cgagacgtcc	37320
cggaaacgggt	tgggtggccgc	actcgcgggg	acggcggccg	aagatcagct	cgcctgtcgt	37380
tcacccgggt	tgttcgttcg	cagagtgggtg	cgcgcagcgc	ggaacccccg	gtcagagaca	37440
tggcgtagcc	ggggaacggg	cctcatcacg	ggcggaacag	gcgcgctcgg	tgcgagggtc	37500
gcacgatggc	tggcccggcg	gggagctgag	cacctggtgt	tgatcagtcg	ccgcggccccg	37560
gaagctcccg	gcgcagcggg	cctaggggccc	gagctgactg	aactcggcgt	gaaagtcaca	37620
gtcttggcct	gcgatgtgac	ggaccgcgac	gagctggcgg	cgggtgctggc	ggccgttccc	37680

acggagtatc	cgtgtgcggc	ggtcgtgcac	accgccggcg	tcgggacgcc	tgcgaaacctg	37740
gccgagacga	ccttggcgca	gttcgccgac	gtgttgcgg	ccaaggtcgt	cggcgcggcg	37800
aacctggacc	ggctgcttgg	cgggcaaccg	ttggacgcct	tcgtgctgtt	ctcctcgatc	37860
tcgggagttt	ggggagccgg	cggccaaagg	gcctattcgg	ccgccaatgc	gtatctcgat	37920
gcccttgccg	agcgccgacg	ggcttgccgg	cggcgcggca	cgtgcacgcg	ctggggtcgg	37980
tgggcgggtg	cgggcatggc	cgttcaggaa	ggtaacgagg	cgcactctcg	ccgaaggggc	38040
ctggtaccga	tggaaaccga	gtcgccctc	ttcgcgctgc	aacaggccct	gtcccaacga	38100
gaaaccgcca	tcaccgtcgc	agatgtggac	tgggagcgat	tcgcgcctc	tttcaccgcg	38160
gcccgccgc	gaccactgtt	ggaagagatc	gtggatctac	ggcccgacac	cgagaccgag	38220
gagaagcacg	gtgccggcga	gctggggcag	cagctggccg	cactgccgcc	cgctgagcgc	38280
ggacacctgc	tgctggaggt	ggtgctggcg	gaaaccgcca	gcaccctggg	gcacgattcg	38340
gcggaggctg	tgcaaccgca	tcggaccttc	gccgaactgg	gcttcgattc	gctgaccgcg	38400
gtagagctgc	gcaacagggt	gaacgcgggt	accgggcttc	gcctgccgcc	gacgctgggt	38460
ttcgaccacc	cgacgccgct	ggcgttgtcc	gaacagttgg	ttccggccct	ggtcgcggag	38520
ccggacaacg	gcatcgaatc	gctgctcgcc	gagctcgaca	ggctggatac	cacgttggcg	38580
caagggcctt	cgatcccat	ggaagaccag	gccaagggtg	cggagcgctt	gcacgcactc	38640
ctcgccaagt	gggacggggc	gcgtgacggc	acggccagag	cgacgtcacc	ccaatcgctg	38700
acggcggcca	cggacgacga	aatcttcgac	ctcatcgacc	ggaagtcccg	gcgtgaccg	38760
ccctttcctc	gcctcagctc	ccctgattac	tggaaagggt	tatttcgatg	gccaatgaag	38820
aaaagctccg	cgagtacctc	aagcgtgtcg	tcgtcgaact	ggaagaggcg	cacgaacgcc	38880
tgacagagtt	ggagcgccag	gagcacgacc	ccatcgcgat	cgtgtcgatg	ggatgtcggt	38940
atcccggtgg	cgtctccact	ccggaggagc	tgtggcgact	ggtcgtcgac	ggaggagacg	39000
cgatcgcgaa	cttccccgaa	gaccgtggct	ggaatctgga	cgagctgttc	gatcctgatc	39060
cgggcccagc	cgggacctcc	tacgtccggc	aggggtgggt	cctgcgcggg	gtcgcggact	39120
tcgatcgccg	gctcttcggg	atcagtcgcg	gcgagggaca	ggcgatggac	ccgcaacagc	39180
ggttgctgct	ggagatctcg	tgggaggtgt	tcgagcgcgc	cggcattgac	ccgttttctt	39240
tgccgggtac	caagaccggt	gtgttcgcgg	gcctgatcta	ccacgactac	gcgtcgcggg	39300
ttcgcaagac	ccccgcggag	ttcgagggtt	acttcgccac	cggcaacgcg	ggcagcgtcg	39360
catccggccg	ggtggcttac	accttcgggt	tagagggcc	ggcggtcacc	gtggacaccg	39420
cctgctcgtc	gtccctgggt	gcgtgcacc	tggcctgcca	gtccctgcgg	ctgggcgaat	39480
gcgacctggc	cctggccggg	ggcatttcgg	tgatggccac	gccgggagcc	ttcgtcgagt	39540
tcagccggca	acgcgcactc	gcctcggatg	gccgggtgca	gcccttcgcg	gatgccgcgg	39600
acggcaccgg	ctggggcgag	ggcgccggaa	tgctgctgct	ggaacggctg	tcggacgcac	39660
gacgaaacgg	ccacccggtg	ctggcgccgg	tggtcggttc	cgcgatcaac	caggacggga	39720
cgtccaacgg	cctgaccgcg	cccagcggtc	ccgcacagca	gcgagtgate	cgccaagccc	39780
tggcgaacgc	cgggttgctg	ccgcgcgagg	tcgatgtggt	cgaggcgcac	ggcacgggca	39840
cggccttggg	cgaccggatc	gaggcgccag	ccctgatcgc	cacctacggg	gcgaaccggt	39900
cggcggatca	tccgctgctg	ctgggttccc	tcaagtcgaa	catcgccac	acccaggctg	39960
ccgcgggtgt	ggccgggggt	atcaagtcgg	tccctggccat	caggcaccgg	gagatgcccc	40020
gcagcctgca	catcgaccag	ccatcgcagc	acgtggactg	gtcggcgggc	gcggtgcggc	40080
tgctcacgga	cagcgttgac	tggccggatc	tcggcaggcc	gcgcccagca	ggggtgtcct	40140
cgttcggcat	gagcgttacc	aacgcacacc	tgatcgtcga	ggaagtatcc	gacgagccgg	40200
tctcgggcag	taccgagccg	accggggcat	ttccctggcc	gctgtccggc	aagacggaga	40260
cggcattgct	cgagcaggct	gccgagttgc	tctccgtagt	gaccgagcac	ccggagccgg	40320
gactggggga	cgtcgggtac	tcgtggcca	ccggtcgcgc	tgcatggag	caccgggctg	40380
tcgtgggttc	cgacgatcgg	gactctttcg	tcgcgggact	gacggcggtg	gctgcggggc	40440
ttccggcagc	caacgtgggt	cagggcgcgg	ccgactgcaa	gggaaaggct	gcgttcgtgt	40500
tccccggcca	gggctcgcac	tggcagggga	tggcgaggga	actgtccgaa	tcctcgccgg	40560
tgttccggcg	gaagctggcg	gaatgcgcgg	cggctacggc	cccttacgtg	gactggctgc	40620
tgctcggcgt	ccttcgcggg	gatcccgatg	caccgcgcgt	ggatcgcgac	gacgtgattc	40680
agctcgcgct	gttcgccatg	atgggtgtcg	tggccgaact	gtggcggttc	tgccggagtgg	40740
agcccgcgc	ggtggtcggg	cattcccagg	gcgagatcgc	cgcgcgccat	gtggcaggcg	40800
ctttgtcctt	gactgatgcg	gtgcgcacat	tcgctgcccg	ctgcgatgcg	gtgtcggcgc	40860
tgaccgggaa	gggaggcatg	ctcgcgattg	ccttgccgga	aagcgcgggt	gtgaagcgaa	40920
tcgcaggcct	gccggagctg	accgttgccg	cggccaacgg	acccggctcc	actgtcgttt	40980
ccggcgaacc	gtcggctctg	gagcgtctgc	agaccgaact	gaccgcggaa	aacgtgcaga	41040
ccggcggggt	gggaattgat	tacgcctcgc	attcgcgcga	gatcgcgcag	gtccagggcc	41100

ggcttctgga	ccggtctgggc	gaagtcgggt	ccgaacctgc	tgagatcgct	ttctactcga	41160
cggtcaccgg	cgagcggacg	gacaccggcc	gactcgacgc	cgactactgg	taccagaacc	41220
ttcggcagcc	cgtccgcttc	cagcagaccg	tcgcccggat	ggcagatcag	ggctatcggg	41280
tcttcgtcga	ggtgagcccc	caccgcgtgc	tcaccgcggg	aatccaggaa	acgctggaag	41340
ccgcggacgc	gggcgggggtg	gtggtcgggt	cgtcgcgggc	tggcggaggc	ggctcccggc	41400
gctggctgac	ttcgctggcc	gagtgccagg	tgcgcggact	gccggtgaat	tgggaacagg	41460
tattcctcaa	caccggagcc	cgacgcgtgc	cgtcgccgac	ctacccgttc	cagcggcagc	41520
ggtactgggt	ggagtcggcc	gagtacgacg	cgggcgatct	cggttcgggtg	ggcttgctct	41580
ccgcggagca	tcccctgctc	ggggctgcgg	tgacgctggc	cgatgcgggc	gggttcctgc	41640
tgaccggcaa	gctgtcggtc	aagaccagc	cctggttggc	cgaccacgtg	gtcggcgggg	41700
cgatcctgct	gcccggcacc	gcgttcgtgg	aaatgctgat	acgcgcgcgc	gaccaggctc	41760
ggtgcgatct	gatcgaggag	ttgtccctga	cgactccgct	ggttttgccc	gcgaccgggtg	41820
cggtgcagggt	gcagatcgcg	gttggcgggtc	cggacgaggc	cgggcgcgcg	tcggtcgcgc	41880
tgcattcctg	tcgagacgac	gccgtgccgc	aggactcgtg	gacctgccac	gcgaccggca	41940
cgttgacctc	cagcgatcac	caggacgccg	gccaggggcc	cgatgggatt	tggccgcccc	42000
acgatgctgt	cgcgggttccg	ctggacagct	tctacgccc	cgcagctgag	cggggcttcg	42060
atttcggccc	ggcgttccag	gggttgccagg	cggcttgga	gcgcggagac	gagatcttcg	42120
ccgaggtcgg	cctgcccacc	gcacaccgcg	aagacgcggg	cagggttcgga	atccaccctg	42180
ctctgctgga	tgcggcactg	caggcgctgg	gcgcagccga	agaggatccg	gacgagggat	42240
ggctcccgtt	cgcgtggcaa	ggtgtgtccc	tcaaagcgac	gggcgcactt	tcccttcggg	42300
tgcacctcgt	tccggcgggc	gcgaatgcgg	tgtcgggtgt	cacgaccgac	acgactggcc	42360
aagcgtgct	ctccatcgat	tcgctggtgc	tgcgccagat	ttcggacaag	cagttggcag	42420
cggcccgtgc	gatggaacac	gagtcctgt	tccgggtcga	ctggaagcga	atctcgccc	42480
gcgtgccaa	gccggtctcc	tgggcagtga	ctggcaatga	cgaactcgcc	cgagcctgcg	42540
gctcggcact	tggcacggaa	ctccacccc	acctgaccgg	gttggctgac	ccgcccctcg	42600
acgtcgtggt	ggtgccatgc	ggtgcgtctc	gccaggactt	ggacgttgct	tccgaggcac	42660
gtgcgcgcac	acaacgcattg	cttgacctga	tccaggattg	gttggcggcg	gcgcgattcg	42720
ccggatctcg	cctgggtggtt	gtgacgtgtg	gtgcggcgtc	gacaggctcc	gccgagggtg	42780
tttcggacct	ggtgcatgct	gcgtcgtggg	gtttgttgcg	ttcggcgcag	tcggagaacc	42840
cggaccgatt	cgtgttggtc	gatgtggacg	gaaccgccga	atcatggcgt	gcgctcgcgg	42900
cggccgtgcg	ttccggagaa	ccgcagctgg	cgttgccgcg	cgggtgaagtc	cgggtgcctc	42960
gcctggcgcg	atgtgttgcc	gccgaggaca	gccggatccc	agtgcccggt	gcggatggga	43020
cgggtgttgat	ttccggcggg	acgggcctgc	tgggcggggt	ggttgcccgg	catttggttg	43080
cggagcgcgg	tgtccgcgcg	ctggtgctcg	cggggcgacg	cggctggagc	gccccgggg	43140
tcaccgacct	ggtggatgag	ttggtgggcc	tgggagctgc	ggtcgagggtg	gcgagctgcg	43200
atgtcgggga	tcgggcccag	ttggaccggc	tgctgacgac	gatctcggca	gagttcccgc	43260
tgcgcggagt	ggtgcatgcg	gccggggcac	ttgccgacgg	ggtcgtcgag	tcgctgacac	43320
cagagcacgt	ggcaaagggtg	ttcggcccga	aggccgcggg	tgcgtggcac	ctgcacgagt	43380
tgactcttga	tctggatctc	tcgttcttcg	tgctcttctc	ctcgttctcc	ggcgtggcgg	43440
gggctgcggg	tcagggaaac	tacgcggcgg	cgaacgcgtt	cctggacggc	ctggctcagc	43500
accggcggac	ggcggggctg	cctgcgggtg	cgtggtcttg	gggcttggtg	gagcagccca	43560
gcgggatgac	gggagcgctc	gatgcggcgg	gccgtagccg	cattgcgcgc	accaatccgc	43620
cgatgtccgc	gccggacggg	ttgcggctgt	tcgagatggc	gtttcgcgtt	ccgggcgaat	43680
cgttctggt	tccgggtccac	gtcgacctga	acgccctgcg	cgtgatgcg	gccgacggcg	43740
gtgtgcctgc	gttggtgcgc	gacctggtgc	cagcgcctgt	gcggcggagc	gcggtcaacg	43800
agtcggcgga	cgtcaacggg	ctgggttggtc	ggctgcggag	gctgccggac	ctggatcagg	43860
aaaccagct	gttggttttg	gtgcgcgagc	atgtttcggc	ggtgctgggg	cattcgggtg	43920
cggtcgagggt	cggggccgat	cgtgctttcc	gggattttgg	ttttgattcg	ttgtccgggtg	43980
tggagtttcg	gaaccggctt	ggcggggtgc	tgggcgttcg	gttgccggct	actgcgggtg	44040
tcgactatcc	gacaccgcgg	gcgttggttc	ggttcttgct	cgacaaactg	attggtggcg	44100
tggaggctcc	gactcccgcg	ccggcggctg	tggcggcggt	gactgctgac	gatcccgttg	44160
tgatcgtggg	gatgggctgt	cgttatccgg	gtggggtgtc	ctcgcgggag	gagctttggc	44220
gtttggtggc	cgggggcttg	gatgcgggtg	cggagttccc	ggacgatcgt	ggctgggatc	44280
aggcgggggt	gttcgatccg	gatcccgatc	gtcttgggac	ctcgtatgtg	tgtgagggtg	44340
gcttcctgcg	agatgcggca	gagttcgatg	ccggtttctt	cgggatttcc	ccgcgtgagg	44400
cgttggcgat	ggatccgcag	cagcggttgc	tgctggaagt	cgtttgggaa	accgtggagc	44460
gggcggggat	tgatccgctt	tcgttgccgg	ggagccggac	cggcgtgttc	gcggggctga	44520

tgcaccacga	ctacggcgcg	cggttcatca	cgagggcgcc	ggagggtttc	gagggttatc	44580
taggtaatgg	cagcgcgggg	ggcgtgtttt	cgggtcgggt	tgcgtattcg	tttggtttcg	44640
agggctcctgc	ggtgacgggtg	gatacggcgt	gttcgtcgtc	gttgggtggcg	ctgcacctgg	44700
cgggtcaagc	actgcgggtct	ggtgagtgtg	atctggctct	tgcgggtggt	gtgacgggtga	44760
tggccacgcc	ggggatgttc	gtggagtttt	cgcgtcaacg	gggcttggcg	gcggatgggc	44820
ggtgcaagtc	gtttgcggcg	gctgcggatg	gcaccggttg	gggagaaggc	gcgggcttgg	44880
tgttgttggg	gcggctgtcg	gatgcccggc	gcaacgggca	cgcggttctg	gcggctcgtgc	44940
ggggtagcgc	ggtgaatcag	gatggtgctg	cgaatggttt	gacggcgccg	aatgggccct	45000
cgcagcagcg	ggtgatcacg	caggcgttgg	cgagtgcctg	tttgtcgggtg	tctgatgtgg	45060
acgccgtgga	ggcgcatggg	actggaacca	ggcttgggtga	tccgattgag	gcgcaggctc	45120
tgattgccac	ttacgggcag	gggcgggata	gcgatcgcc	gttgtggttg	gggtcgggtga	45180
agtcgaatat	tggtcatacg	caggcggcgg	cgggtgtcgc	tgggtgtgatc	aagatgggtga	45240
tggcgatgcg	gcacgggcag	ctgcccgcga	cgttgcatgt	ggatgaacct	acgtcgggaag	45300
tggattgggtc	ggcgggggat	gtccagctcc	tcacggagaa	caccccttgg	cccggcaaca	45360
gccatcctcg	gcgggtgggc	gtgtcgtcgt	tcgggatcag	cggcaccaac	gcacacgtca	45420
tcctcgaaca	agcctcgaaa	acaccagacg	agactgcgga	caagagcggg	cccgattcgg	45480
aatcgaccgt	ggaccttcca	gcggtcccgt	tgatcgtgtc	ggggagaaca	ccggcagcgc	45540
tcagcgctca	ggcgagcgca	ttgttgtcct	atgtgggtga	gcgtggcgat	atttccacgc	45600
tggatgcggc	gttttcgttg	gcttcctccc	gggccgcgtt	ggaggagcgg	gcggtgggtgc	45660
tgggagcgga	ccgcgaaacg	ttgttgtccg	ggttggaagc	gctggcttcc	ggtcgcgagg	45720
cttctgggggt	ggtgtcggga	tcccgggtct	ctggcgggggt	tgggttcgtg	ttcgcgggtc	45780
agggcggaca	gtggttgggg	atgggcgggg	ggctctactc	ggtttttccg	gtgttcgctg	45840
acgcgtttga	cgaagcatgt	gccggactgg	acgcgcactc	ggggcaggac	gtgggggtcc	45900
gggatgtggt	gtttggttcc	gacgggtcct	tgttggtatcg	gacgctgtgg	gcccagtcgg	45960
gtttgttcgc	gttcaggtt	ggtttgcgtga	gctgctggg	ttcgtgggggt	gtccggcccg	46020
gtgtggtgct	gggccattcg	gtcggcgagt	tcgcgcgggc	ggttgcggcg	ggagtgtgtg	46080
cgttgccgga	tgcggctcgg	atggtggcgg	gtcgtgcccg	gttgatgcag	gcgttgccct	46140
ctggcgggtgc	catgttggcg	gtggctgctg	gtgaggagca	gctgcggccg	ttgttggccg	46200
atcgggttga	tgggtcgggt	atcgccgcgg	tcaacgctcc	tgagtccgtg	gtgctctccg	46260
gcgatcggga	ggtgcttgac	gacatcgccg	gcgcgctgga	tgggcaaggg	attcgggtggc	46320
ggcgggttgcg	ggtttcgcac	gcgtttcatt	cgtatcggat	ggacccgatg	ttgcaggagt	46380
tcgccgaaat	cgcacgcagc	gtggactacc	ggcgtggcga	cctaccgggtc	gtgtcgacgt	46440
tgacgggtga	gctcgacacc	gcaggtgtga	tggctacgcc	ggagtattgg	gtgcgtcagg	46500
ttcagagacc	cgtccgcttc	gccgacggcg	tccgggtgct	cgcgcagcaa	ggggtcgcca	46560
cgatcttcga	actcggccct	gatgcgacgc	tgtcggccct	gattcccgat	tgtcattcgt	46620
gggctgatca	ggccatgccg	attccgatgc	tgcgtaaaga	ccgtacggaa	accgaaactg	46680
tggtcgccgc	ggtggcgcg	gcgcacacgc	gtggtgttcc	ggtcgaatgg	tcggcgtatt	46740
tcgccggcac	cggggcacgg	cgggtcgagt	tgccgacgta	tgcttccag	cggcagcgggt	46800
actggctgga	aacatcggat	tacggcgatg	tgacgggtat	cggcctggct	gcggcggagc	46860
atccgttgct	gggggcccgtg	gttgcgctgg	ccgatggtga	tgggatggtg	ctgaccggcc	46920
ggttgtcggg	ggggacgcac	ccgtggctgg	cccagcatcg	cgtgctgggc	gaggtcgtcg	46980
tcccgggcac	cgccatcctg	gagatggccc	tgacgcagg	ggcgcgtctc	ggctgtgacc	47040
gggtggaaga	gctcacctcg	gaaacaccgc	tgggtggccc	cgaacgcgcg	gcgggtgccc	47100
gtagtcgtgg	ccctgcggga	gggaccacag	tttcaattga	aactgcggaa	gaacgtgtgc	47160
ggacgaacga	cgccatcgaa	atccagctgc	tgggtgaacgc	acccgacgaa	ggcggtcggc	47220
gaagggtgtc	gctgtattcc	cgcccggccg	gtgggtcgag	aggtgggggt	tggacgcgcc	47280
acgccaccgg	cgaactcgtc	gtcggcacca	cgggtggtag	ggcggttcct	gattgggtcg	47340
ctgagggtgc	cgagtgcatt	gctctcgatg	agttctacgt	cgtctggcc	ggaaacgggt	47400
tcgagtacgg	gccgttgttc	caggggcttc	aggcggcatg	gcgtcgtggt	gacgaggttc	47460
tcgccgaaat	cgccccgcgg	gccgaggccg	atgcgatggc	gtcgggatac	ctgctcgacc	47520
cagcgttgct	ggatgcccg	ctgcaggcgt	ccgcgctcgg	cgaccgccc	gagcaaggcg	47580
gcgcgtggct	gccgttctca	ttcaccggcg	tcgaactttc	cgtccggca	gggacgatca	47640
gcagggtgcg	gctggagacc	aggcgacccg	acgcgatatc	ggtggccgtg	atggatgaga	47700
gtgggcgggt	gctcgccctg	atcgattctc	tcaggctacg	aagcgtgtcg	tcgggacagc	47760
tggcgaatcg	ggacgctgtc	cgcgacgcgc	tgttcgaggt	gacctgggag	ccggtggcga	47820
cgcagtcgac	ggaaccgggt	cgtcgggccc	tgttgggtga	tactgcctgc	ggtaaagacg	47880
atctcatcaa	actcgcaacg	gattccgcgc	accgctgcgc	ggatctggcg	gcgctagccg	47940

agaaacttga	ttccagcgcg	ctggttcctg	atgtcgtggt	ctactgcgcc	ggagaacagg	48000
cggatcccgg	caccggcgca	gccgcacttg	cggagaccca	gcagacgttg	gctctgctcc	48060
aagcgtgggt	ggctgagccg	cggttggccg	aggcacgtct	ggtggtgggt	acgtgtgcag	48120
cggtgacgac	ggctccgagt	gacggtgcat	cagagctggc	acatgcgccg	ttgtgggggt	48180
tgttgcgtag	cgcgcaggtg	gagaaccccg	ggcagtttgt	gctggcggac	gtcgcacgaa	48240
ccgccgaatc	gtggcgtgag	ttgccgagtg	cgttgggctc	gatggaaccg	cagttggccc	48300
tgcggaaggg	cgcggtgcca	gcgccccgct	tggcttcggg	cgcggggcag	atcgacgtgc	48360
ccgcggttgt	ggcggatccc	gaccgaaccg	tgctgatttc	gggcggcacg	ggcctgttgg	48420
ggggcgcggt	tgcccggcac	ctggtgaccg	aacgcggtgt	ccgcgatttg	gtgttgacgg	48480
gccgtcgtgg	ctgggatgct	cctggaatca	ccgagttggg	gggtgagctg	aacggcctcg	48540
gtgccgtggg	cgacgtgggt	gcgtgcgacg	tcgcggatcg	tgctgatctg	gagtcgttgc	48600
tggcgggcgg	cccggcgga	tttccggttg	gcggcggtgg	gcatgcccg	ggggcgctgg	48660
ccgacggggg	gatcgagtcg	ttgtcaccgg	acgacgtggg	agcgggtgtc	ggcccgaagg	48720
cggcgggggg	gtggaatctg	cacgagctga	ctcgtgatac	ggacctgtcg	ttcttcgctg	48780
tgtttctctc	gctttccggg	gttgccggcg	ctcctgggtc	gggcaattat	gcggcggcga	48840
acgcgttcct	ggacgcattg	gcgcattacc	ggcggtcaca	gggactgcct	gcgggtgtcg	48900
tggcctgggg	cctgtgggag	cagccgagcg	ggatgacgga	gacgctcagc	gaggtcgacc	48960
ggagcaggat	cgcgcgcgcc	aaccgcgcgt	tgtccacca	ggagggattg	cggctgttcg	49020
atgccgggct	ggcgtgggac	cgggcagcgg	tagttccggc	gaagttggac	aggactttcc	49080
tggccgagca	ggcgcggtcg	ggctcgctgc	ccgcattgtt	gacggcactg	gtacccccca	49140
tccgtcgtaa	taggcgggct	agcgggaacc	agctcgcgga	cgagggcacc	ctgctcgggg	49200
tgggtcgggg	gcatgcccg	gccgtgctgg	ggtattcgag	cgcggctgac	gtcggggctg	49260
agcgcgcttt	ccgggatctg	ggttttgatt	cgttgtctgg	tgtggagttg	cggaaaccgc	49320
ttgccggggg	gctgggggtg	cggttgcggg	cgaactgcgg	gttcgactat	ccgacgccga	49380
gggcgctggc	ccggttcctg	caccaggaac	tggcagacga	gatcgctacg	acgccagcgc	49440
cgggtgacgac	gaccagggca	ccggtcgccg	aagacgatct	cgtcgcgata	gtcgggatgg	49500
gatgccgttt	tcccggtcag	gtgtcctcgc	cggaggagct	ctggcgtttg	gtggcggggg	49560
gcgtggatgc	ggtcgcgga	ttcccagccg	atcgcggtcg	ggatctggca	ggcttgttcg	49620
atccggaccc	ggaacgggct	gggaagacct	acgtgcggga	aggggccttc	ctcaccgacg	49680
ccgatcgggt	cgatgcgggt	ttcttcggga	tttcccccg	tgaggcgttg	gcgatggatc	49740
cgcagcaacg	gctgttgctg	gagctgtcct	gggaggccat	tgaacgggca	gggatcgatc	49800
cgggttcgct	gagggggagt	cggaccgggt	tgttcgcggg	gctgatgtac	cacgactatg	49860
gcgcccgggt	cgccagccga	gccccggaag	gtttcgaggg	gtatctcggc	aatggcagtg	49920
ctgggagtg	cgcgtcgggc	cggattgcgt	actcgtttgg	tttcgagggt	cctgcgggtg	49980
cgggtggatac	tgcgtgttcg					50000

<210> 6

<211> 29736

<212> DNA

<213> *Saccharopolyspora spinosa*

<400> 6

tcgtcggttg	tggcggttga	tttggcgggg	cagtcggttg	gttccggcga	atgcgatctc	60
gcccttgccg	gtggtgtgac	ggtgatgtcg	acgcccgga	cgtttgtgga	attctcccgt	120
cagcggggcc	tggcaccgga	cgggcgggtg	aagtcgttcg	cggagagcgc	ggacggtacc	180
ggttgggggt	aggggtgctg	tttgggtgtg	ttggagcggg	tgtcggatgc	tcggcggaat	240
gggcatcggg	tgttggcggt	ggttcgtggg	tcggcggtga	atcaggatgg	tgcgtcgaat	300
ggcttgaccg	cgccgaatgg	tccttcgcag	cagcgggtca	tccagcaggc	gttggcgagt	360
gcgggtctgt	cgggtgtccga	tgtggatgcc	gtggaggcgc	atgggaccgg	gaccaggttg	420
ggtgatccga	ttgaggcgca	ggctctgatt	gctacgtatg	ggcgcgatcg	tgatcccggg	480
cggccggttg	ggttgggggt	ggtgaagtcc	aacatcggtc	atacgcaggc	ggcggcgggg	540
gttgccgggt	tgatcaagat	ggtgatggcg	atgcggcacg	ggcaacttcc	gcgcacgctg	600
cacgtggatg	caccctcctc	gcaggtggat	tggtcggcgg	ggaggggtcca	gctcctgacg	660
gagaacacgc	cctggcccga	cagtggctgc	ccctgtcggg	tgggggtgtc	gtcgttcggg	720
atcagcggca	ccaacgcgca	cgtcatcctg	gaacagtcca	cggggcagat	ggatcaggca	780
gcggagccgg	attcgagtc	tgttctggat	gttccgggtg	tgccgtgggt	ggtgtcgggc	840

aaaacacccg	aagcgctatc	cgcccaggcg	gcaacgttgg	cgacctat	ggaccaa	900
gttgatgtct	cccctctgga	cggtgggatt	tcgcttgccg	tgacctgttc	ggcgctggat	960
gagcggggcg	tggtgctggg	gtcggatcgt	gacacgttgt	tgtctggcct	gaatgcgctg	1020
gctgccggtc	atgaggtctg	tggcgtgggt	acgggacctg	tcgggatttg	tggccggacc	1080
gggtttgtgt	tcgccgggtca	aggcgggtcag	tggttgggga	tgggccgccg	gttgtactcg	1140
gagtttccgg	cgttcgccgg	tgctttcgac	gaagcatgcg	ccgagctcga	tgcgaacctg	1200
gggagggaa	tcgggggttcg	ggatgtgggt	ttcgggtccg	acgagtcctt	gctggatcgg	1260
actttgtggg	cgcagtcggg	tttgttcgcg	ttgcaggctg	gtctctggga	attgttgggt	1320
acgtgggggt	ttcggcccag	cgtagtgctg	gggcattcgg	tcggggagct	agccgcggcg	1380
ttcgccgcag	gtgtgctgtc	gatggcggag	gcggtccggc	tgggtggcggg	tcgtgcgcgg	1440
ttgatgcagg	cgttgccttc	tggcgggtgcc	atgctggcgg	tgtccgcgac	cgaggcccga	1500
gtcggcccg	tgctcgatgg	gggtgcgggat	cggttgggtg	tcgcagcggg	taacgctccg	1560
gggtcggtgg	tgctttccgg	tgaccgggat	gtgctcgatg	gcattgccgg	tcggctggac	1620
gggcaaggta	tccgggtcgag	gtgggtgcgg	gtttcgcacg	cgtttcattc	gcacggtatg	1680
gatccgatgc	tggcggagtt	cgccgagctc	gcacggagcg	tggactaccg	gtctccacgg	1740
ctgccgattg	tctcgacgct	gaccggaaac	ctcgatgacg	tgggcgtgat	ggctacgccg	1800
gagtattggg	tgccgccagg	gcgagagccc	gtccgcttcg	ccgacggtgt	ccaggcgctt	1860
gtggaccaag	gcgtcgacac	gattgtggaa	ctcgggtccg	acggggcggt	gtcgagcttg	1920
gttcaagagt	gtgtggcgga	gtccggggcg	gcgacgggga	ttccgttggg	gcgagagagc	1980
cgtgatgagg	tccgaacggg	gctggacgct	ttggcgcaga	cccacactcg	tgggtggcgcg	2040
gtggactggg	ggtcattttt	cgctgggtacg	agggcaacgc	aagtgcacct	tcccacgtat	2100
gccttccaac	gacagcggta	ctggctggag	ccatcggatt	ccggtgatgt	gaccggtgtt	2160
ggcctgaccg	gggcccagca	tccgctgttg	gggtgcggtg	tgccgggtcgc	gggcccgcgt	2220
gaggtgctgc	tgaccggcag	gctgtcgggt	gggacgcac	cgtgggtggc	ggaacaccgc	2280
gtgctggggc	aagtgcgtcg	ccccggcacc	gcgttgcctg	agatggcggt	gcggggcggt	2340
agccaggctg	gttgtgaacg	tgtggaggag	ctcaccttgg	aggcaccgct	ggctcctgcg	2400
gagcggggcg	ctgcggcggt	gcagttggcg	gtgggggctc	cggatgaggc	cggccggcg	2460
agtttgacgc	tctattcccg	aggcgtgat	gaagacggcg	actggcgggg	gattgcctcc	2520
gggctgttgg	cccaggccaa	tgcggtgccg	ccggcggtat	cgacggcatg	gccgccggac	2580
ggcgccgggg	aggctgatct	ggcggagtct	tacgagcgcc	tcgccgagcg	cggcttgacc	2640
tacggtccgg	tattccaagg	gctccgcgcc	gcattggcgg	acggcgacga	tatcttcgcc	2700
gaattggccg	ggtcaccaga	cgctcgggt	ttcggcatcc	acccggcgct	gctggacgct	2760
gcaactgcac	cgatggcgct	tgggtgcttc	cccgaactcg	aagcgcgtct	gccgttttcc	2820
tggcgtggcg	cccagctgta	ccgcgctgaa	ggagcagcgc	ttcgggtacg	gctctcgccg	2880
ctggggtccg	gtgcagtcct	attgacgttg	gtggatgcca	cagggcgacg	agtgcgtgcg	2940
gtggaatcgc	tttcgacgcg	accggtctcc	accgaccaga	tcgggtgccg	tcgcggcgat	3000
caagagcggc	tgctgcacgt	cgagtggtta	aggctcggctg	aatctgcggg	gatgtctctg	3060
acctcctgcg	cgggtggtcg	tttggggcaa	ccggagtggc	acgctgcgct	gaagaccact	3120
ggtgtccaag	tcgagtccca	tgcggacctt	gcttcgttgg	ccaccgaggt	tgccaagcgg	3180
ggttcagctc	ctggtgcggg	catcgtcccg	tgcggcgac	cccgaagcgt	gcaggagctg	3240
ccgaccgccg	cgcgaagggc	gacgcaacag	gcgatggcga	tgctgcagca	atggcttgcc	3300
gatgaccggg	tcgtcagtag	gcgcctgac	ctgctgacgc	atcgggcggg	ctccgcagtt	3360
gctggagaag	acgtgctcga	cctgggtacac	gcgcgctgtg	ggggcttggg	ccgcagcgcg	3420
caagcggagc	acccggaccg	attgcgcttg	atcgatatgg	acgacgagcg	agcatcgacg	3480
acggcactcg	ccgaagcgct	gactgcggga	gaagcgcagc	tcgcgggtgcg	gtcgggagtt	3540
gtgctggcgc	ccgcctccgg	ccagggtgaag	gtgagtggag	gtgaagcggt	cagggtgggat	3600
gaaggcaccg	tgctggtcac	cggcggaacc	ggcgggctcg	gggccctgct	cgcacgccat	3660
ctgggtcagc	cccacgggtg	gcggcacctg	ttgctcgcaa	gtcgccgtgg	tctggcgggc	3720
cccgagcggg	atgagctggg	ggccgagctg	gagcaggccg	gcgccgacgt	cgcgggtcgt	3780
gcgtgcgact	cggcagatcg	ggactcgctt	gcgcggctgg	tggcgtcggt	gcctgcggaa	3840
aaccggttgc	gggtggtggg	gcacgccgcc	ggtgtgctgg	atgacggtgt	gctgatgtcg	3900
atgtcgccgg	agcgcttgga	cgcggtgttg	cggcccaaag	tggatgccgc	gtggtacctg	3960
cacgagctga	ctcgggaact	cggctctgtc	gcgttcgtgt	tgttctcctc	ggtcgcgggc	4020
ctgttcggcg	gtgcggggca	gagcaattac	gctgcgggca	acgctttcct	ggatgccttg	4080
gcgcattgcc	ggcaggccca	ggggctgccc	gcgctgtcgc	tggcctccgg	gctgtggggc	4140
agtatcgatg	gaatggcggg	cgacctcgct	gcggcagatg	tggagcgggt	gtcgcgggca	4200
ggcattggcc	cgctttcggc	accgggaggg	ctggccttgt	tcgacgctgc	cgttggctcg	4260

gacgaaccgt	tgtctggcacc	ggtgcgactg	gatgtcgaag	cactgcgtgt	gcaggccccga	4320
tccgtgcaga	cccggattcc	ggaaatgctg	catggcatgg	caatggggcc	aagccgcccgc	4380
actccgttca	cttcagggt	tgagccgttg	cacgaaccgc	tggccggatt	gtcggagggc	4440
gaacgtcggc	agcaagtgt	ccagcgcgtc	cgcgccgata	tgcgggtggt	actggggcac	4500
ggcaggtcga	gcgatgtgga	catcgagaag	cctttggccg	agctgggttt	cgactcgctg	4560
acggccatcg	aactccgcaa	ccgtctcgct	accgccaccg	gactgcggct	tcccgcgacg	4620
ctggccttcg	accacggcac	tgcggcggca	ctcgcccagc	acgtgtgcgc	gcagctaggc	4680
accgcgaccg	cgcgggcacc	gaggcgaacc	gacgacaacg	acgccacgga	gcccgtgagg	4740
tcgctcttcc	aacaggcgta	tgcggctggc	cggtacttg	acgggatgga	tttgggtaag	4800
gtcgctgccc	agttgcgacc	ggtgttcggt	tgcctggcg	agctggaatc	cctgccgaaa	4860
cccgtccagc	tttcccgtgg	tcccgaagag	cttgcccttg	tgtgcatgcc	ggcgctgac	4920
gggatgccgc	cgcacagca	gtacgcgcgg	atcgccgcgg	ggttcgcgga	tgtgcgggac	4980
gtttcgggtga	tcccgatgcc	tggattcatt	gcgggagaac	cgtgcgcgtc	cgccatcgag	5040
gtggcgggttc	ggacgcaggc	ggaggcgggtg	ctgcagggaat	tgcggggggg	ctcgttcgta	5100
ctggctggggc	attcctccgg	gggctggctg	gcgcacgagg	tagccgggtga	gctggagcgt	5160
cgcgggggtcg	tcccggccgg	ggtcgtactg	ctggacacct	acatccccgg	tgagatcacg	5220
ccgaggttct	ccgtggcgat	ggcccaccgg	acgtatgaga	agctcgcgac	tttcacggac	5280
atgcaggatg	tcggtatcac	cgcgatgggc	gggtacttcc	ggatgttcac	cgagtggact	5340
ccgacgccga	tcggtgctcc	gacgtgttcc	gtgcggaccg	aagattgcgt	cgcagaccct	5400
gaagggcgggc	cgtggacaga	tgaactcctg	cggccagggt	ggactctcgc	ggatgccacg	5460
gtccagggtgc	cgggcgacca	cttctcgatg	atggacgagc	acgccgggtc	caccgcacag	5520
gcagtcgcga	gttggcttga	caaactcaac	cagcgcaccg	ctcggcaacg	ctgacggggc	5580
tcccttttagg	accttctggg	cggcaccggc	caccccgggc	gtgccgcctt	ccgtggtcca	5640
ggctcgcgga	tcttgacggc	gcacgatcgt	cggcacgcgc	gctgatcgtg	attccgctgc	5700
cgtcgcgggc	cgtcggcctg	gcgaatcatg	tcccttcggg	caacgtcaaa	cgaattcgctc	5760
cgagcccgca	ttccgaggtg	aggggcaccc	ttgggtggct	gagccgctca	aggggtgccc	5820
tcacctcgaa	attcgtccga	tttgggcggg	ggacgcaacc	ccggtggggc	tgggtgcgtct	5880
ttcttgttga	cagagcgggtg	agaagccgct	gacacacctg	agaggaaaag	gggagcatga	5940
tgtcaagcg	ccaccgtttg	acgaccgcca	tcaccggcct	tctgggggga	gtactgctgg	6000
tcagcggctg	cggaaaccgcc	gccgcacttc	agtccctcgc	ggcgcccggg	catgacgcgc	6060
gcaatgtttg	tatggcctcg	ggcggggggc	gcggggacat	cggcacgtcg	aactgctcgg	6120
aggccgattt	cctcgccacc	gcgacaccgg	tgaaggcgga	ccccggcagt	ttcatcgtgg	6180
cgtacgggaa	ccggtcggac	aagacctgca	cgatcaacgg	cggcgtgccg	aacctcaagg	6240
gcgtggacat	gagcaactcg	ccgatcgagg	acctgccggg	cgaggacgtg	cggcttcccg	6300
acgcgcccga	ggaattcacc	ctccagcccg	gtcagagcgc	gtacgccggc	attggcatgg	6360
tccctggccga	cagcggcgac	ccgaacgccc	atgtcctcac	cgggttccag	tcctcgctgc	6420
cggacatgtc	cgaggcccag	ccggtcaacg	ttctcggcga	cggcaacgtg	aagttcgccg	6480
cgaagtacct	gcgagtcagc	tgcgtggtgt	ctaccgcaga	cgagctgcgc	taaaacccat	6540
gtgagtcctg	cagattcgac	ctcgccgtgc	ggcgccctcg	gcgaagcgtc	cgtacgtttg	6600
tcgttgtgac	cagcgttggt	cacgtccggg	cgcagcgtcg	gtacatactc	aggcgtctcg	6660
ggcgccctcca	acggggcctg	gcacccgggg	cgcctcagtg	cggcggcgct	gacgcgttct	6720
ctgtcggggc	ttgtcacgcc	gccggcctcg	aaccggtccc	gccccgtcgg	agccggtggt	6780
ccagcgcggg	gtggcgggcg	ccggagccga	cgggtgcgcac	cgcctgcccg	agggcctttt	6840
tcgaaccgac	gaggaccacg	accttcttgg	cccgggtgac	cgcctgttag	agcaggttgc	6900
gctgcagcat	catccaggcg	cttgtggtca	aggggatcac	cacgcacggg	tattcgcttc	6960
cctgcgaacg	atggatggtc	accgcgtagg	cgtggaccag	ttcgtcgagt	tctgtgaagt	7020
cgtagtcgat	gtcctcgctc	tgcgtgggtc	gcacggtcat	ggtctgtgct	tcgttgtcga	7080
gggcggacac	gacgccttgc	gtgccgttga	acacgccgtt	ggcgcccttg	tcgtagttgt	7140
tgcggatctg	cgtgaccttg	tgcgcgacgc	ggaagatccg	tccgccgaac	cgcgcgtctg	7200
gcaggccctc	cctggccggg	gtgatcgctt	cctgcaacag	ctggttcagc	gcgcctgcac	7260
ctgcggggcc	tcgatgcac	ggggcgagga	cctgcacgtc	ggtgcgcggg	ttgaaccgga	7320
acttccgcgg	aatccggcgg	gcgacgacgt	cgacggtgag	ctcggcgggtc	ggttcgcttt	7380
cctctacgtg	gaacaggaag	aagtcggtca	gcccgtgtgt	cagcggatag	tccccggcgt	7440
tgattcgggtg	cgcgttggtc	accaccccgg	actcggcggc	ctgccggaac	acctcgttga	7500
gccgcacgtg	tggaatcggg	gtgccagggg	cgagcagatc	gcgcagtacc	tcaccggctc	7560
cgaccgacgg	gagctggtcg	acgtcgccga	ccagcagcag	gtgcgcgccg	ggcgcgatcg	7620
ccttggccag	tttgttggtc	aacagcaggt	cgagcatgga	cgcctcgctc	accacgacga	7680

ggtcggcgctc	cagcggggttg	tcccgggtcgt	aggcggcgctc	cccggcccggc	tggagttgga	7740
gcaggcggtg	cacgggtcgcc	gcgtcgtgctc	cggtagagctc	ggtcagccgc	ttcgccgctc	7800
gtcccgtcgg	cgcggcgagg	atcaccttgg	cctttttcgc	ctgagctaata	gcgatgatcg	7860
accgcacggt	gaagctcttg	ccgcagcctg	gacctccggt	gagcacggcg	acctttctcg	7920
tcaggggccag	cttgacggcg	cgctcctgcg	cctcggcgag	ttcggcaccg	gtagcgcggc	7980
gcaaccagtc	gagggccttg	tgccaatcga	cgtcggcgaa	gacgggcatc	cggtcgcgcg	8040
tggtgttcag	cagccgggac	agctggttgg	ccagggcgac	ttcggcgcgg	tggaaagggca	8100
cgaggtagat	cgcgaccgtc	ggcacctcgt	cgtcactcgg	ggggatctcc	tcgcggacca	8160
caccttcctc	ggtgacgagt	tcggcgaggc	attcgatcac	cagcccgggtg	tcgacggcga	8220
ggatcttcac	cgcctcggcg	atcagctcgt	tctccggcag	gtagcagttg	ccgtcgcggg	8280
tggactccga	cagcgtgaac	tgaaggcccc	cctttaccgc	ctgcggggag	tcgtgcggga	8340
ttcccaccgc	tttggcgatg	gtgtcggcgg	tcttgaaacc	gattccccac	acgtcgcctg	8400
ccagccggta	tggctcttcc	ttgacgggtc	ggatcgcgtc	gtcgtggtac	tgctttaga	8460
tcttcaccgc	cagcgaggtc	gagacgccga	cgccttgccg	gaagatcatc	acctccttga	8520
tcgccttctg	ctcctcccac	gcgtcggcga	tcagcttctg	ccgcttcggg	ccgagcttgg	8580
ggacctcgat	cagccgcgcg	ggttcctgct	cgatgacgtc	gagcgcggcg	acgccgaagt	8640
ggtcgacgat	cttctcggcg	agtttggggc	cgatgccctt	gatcaggcca	gaccccaggt	8700
agcggcggat	accttgccag	gtcgcaggca	gcacggtcgt	gtagtcgtcg	acgtggaact	8760
gccgcccgta	ctgggggtgc	gacccccacc	ggccgcgcgt	gcgcaacgcc	tcgccggggt	8820
gcgcgcccag	cagcgcgcgc	acgaccgtca	ccaggtcacc	gccccggccg	gtgtcgatcc	8880
gcgcgacggt	gtagccgctc	tctcgtttgg	cgaacgtgat	ccgctccagc	gtgcctcca	8940
gcaccgcagt	ccacgtggcc	gactcccgtc	ccttttccac	cgacaacacg	tatcacgaac	9000
ggctgtcaag	caaaccggcg	gtcaccacat	gcagcggcat	ctcccgaacg	cctcgggctc	9060
cggcgtcagc	gggtgggcgt	tcgcgatgcc	ttggtgcggc	cgggtgggagt	tgtagatttt	9120
ttcgtcctcg	cgcagggcct	ggagtaggtg	ccgctggctc	cagatcaggg	gaaagcccg	9180
ggataaaccg	cgttgaggga	ggagatggaa	gagctctacg	tcgaatggcc	agcgaccac	9240
gacgaccccg	agtcatgcgt	cgacgacctg	cgaggccgtg	gcgaagcggt	gacagggggc	9300
acgtgggggc	gtgcgatcag	gtcgcggcgc	cggctcagcg	ccgtgtccgg	acgcaccagc	9360
agccgcgacg	gactggttcc	gctcctcgag	cgcgggtgtc	tcgatcgtct	ttttcgagct	9420
cgatgccggc	cgcgttcgcg	aggtggccag	tccagtcggt	cggcagtcgt	ggtcgcagtc	9480
tgctttttga	acatctggtc	aattcagctt	tgaatgatcg	ttcggcgagt	attgtcctgc	9540
ccgccaattg	tttgctcgcc	gtgcgccctg	ggacaggagc	gcggcggttc	gggacggcgt	9600
gctggcgaag	gtgtcgattg	gctcggacgg	ccggaccagg	atcgccgacg	tcgtgatcgc	9660
cacgagcgct	ggcgatgccc	ggtactatct	ggagcaccag	cgagtggaca	acgacttcca	9720
cgggcgcggg	gcgctcctga	tcatgaatca	agaactgaga	ccgtcagggg	gaacgtgccg	9780
tcgtggggca	ctgtgaggat	gtgcatcaca	cggccggggg	aggtgatcga	ggaggccctg	9840
atcgcggggt	gccgcgggtg	tgcccagtcg	aatcgcagca	ccacctggcc	gcgggtgagc	9900
gtcagcccct	gcgcgtcgag	tgcgactttg	tcggagtccc	tcaccaccaa	cgggatctgc	9960
tcggttgccg	gtgcgttcgc	ctgcaccgac	ctggtgatcc	ggtcgggccc	cacggtcaca	10020
tcggtgacga	ccgagccatt	cgcggtgcgg	tagcggaacc	ggtatggctc	gccgcccagg	10080
aactccgcct	gctgcgggtc	gttcgcgtcc	ggcacctggc	ccgggaagac	cgtcgcgccg	10140
caggcgtggg	cgttgttggt	catcgactgg	acgaccgtgc	ccgcgaccgg	gtgccacagg	10200
aacgtcagac	cgggtgcggc	cagcgagggt	gcgcgcctcg	tgccgaagta	gccgcccagg	10260
tagaactgcg	gcctgcgtag	gaacaggaag	tcttgcccct	ggtcgctgcg	gatctcgggt	10320
aagtgcgcct	gttgggtatg	aagtttcgcg	atcgcgcccg	tgcgctgggc	gcgggtcgga	10380
tagcgctcgc	cgtagatcgc	gtgggtgagg	atgcgcgggt	aggtgtcctg	tttgacgagt	10440
gcgggcaccg	gtgccgggtc	ctcgccccag	gccgctcgtg	cggcggcgag	gtcttcgcgg	10500
ctggacagga	acgcgcccaa	gttcggcacc	actggcacga	actggttggt	cagcgcggta	10560
cgttcggggt	ccggtcgcac	gtcggcgtag	aaccgcgcgg	aggtgcggga	gttggggggc	10620
acgttggcga	accagccgga	gccgtcgggt	tcgcgcagca	ggttgtagct	gagccagtcg	10680
gtgtacttcc	gcgccatcgt	gacgaggttg	gcgttggttg	actggcgcca	cgcgtcggcc	10740
atctccggca	gcatcacctc	gaagttgtag	ttggtgtccg	cgccgggtcaa	ctcgtagaag	10800
tagcccgaag	gactctgccc	gttcgcggca	aggcgcgcga	acgcctcggg	caactgctgc	10860
cgcagcgcgg	ggtcgggggt	ctggttcagc	gcgagcgagg	agccggcgag	cccggcggtg	10920
acctgggttc	cgtagtggat	tgtgggctgc	caggcgctac	cgttgcccgg	gttgaggagc	10980
cacgtcatcg	ctttgcgcag	cgcgaggttg	atctgcgact	ggcggttcgg	caggatgttc	11040
gccgcgcgca	gcagggcgct	ggtcttgctc	aggtacccca	acccgaagcc	ggtggcgggc	11100

agcccgtgct	cggtcggcga	atactccggc	cacgagccgt	catcgtgctg	caaccctagg	11160
tagtgccga	gccccgcgtc	gagcgcggcg	agcagagtcg	cgtcgccccg	gtacgggttc	11220
cacgtgcggg	attgcgtggc	gaaccaggcg	agcgtgtaga	cgtgctcctg	gacgcggggc	11280
ttgtaggaca	ccgcggggt	gcgccaccag	cctccggcga	agaagccgct	cgagtccatg	11340
tcggcgacca	tcggcgagac	cgcggtgagg	tacgacgcga	atcgtgctc	ctcgggtgcg	11400
aacaggcgcc	ggttcgggtg	ggtgggcggc	ggggcgggca	gtgcgagtc	gcgggtcggc	11460
agtgcggcga	gcagtcgag	agcggcgggc	ccggtcatca	ggctgcgacg	gctgaacgta	11520
gtcacgggcc	tacctccttg	tggccgatca	acctcacc	gctgcgtagc	cgcacgtcaa	11580
gatgataatt	cgaattatta	tgggcttgac	gacgcgtagg	ccgacgacgc	agaattcctg	11640
ccaattcgta	ttggcaagcg	gggggtgctc	tggcccagcg	gctcaccag	caggacatcg	11700
cccggtggc	aggagtcagc	caggccacgg	tgtcgtgg	gctcaacaac	cggaaggacg	11760
gcaacgtccg	gatcgcgcg	gagaccgctg	cgcaggtact	ggaggtgatt	cggaagaccg	11820
gctacgtcgc	gaaccgcgac	gcccgcagga	tgcgcgatcg	gcacaaccgc	atcctcggcg	11880
tggtcaccta	cgaggcggtg	ttcccagca	cccacgcgaa	cttctaccag	tcgttcctcg	11940
aaggcatcga	ggaacaggcc	gaggaggtcg	gctgtgacct	gttggtgttc	accagcgcca	12000
aggccaccgg	ggagcggcg	cggattttcg	gcgacgacag	ccgggtgcg	ctcgccgacg	12060
gcagtcgtct	gctcggtcgc	acggtcgacc	gcgacgacct	gaccagctg	ctcgccgaaa	12120
gcatcccgtg	cgtctccatc	ggacgacgcg	acgacgcggg	cggtcgggtg	ccgcacgtcg	12180
gggcgcacta	ccgcaccgcg	gtgcgagacc	tgggtggaccg	cgcggtcgcg	ctcgccacc	12240
gcgggttcgc	gtacgtgggg	tctggtgggg	gcgcggagtc	gtccgcggat	cggctgcgag	12300
gcttcgcga	agccgttgcc	gcacatggcg	tccaagggat	gcatgtggag	acccacagc	12360
tcgatcagct	gcgcgaagcg	ggcgtcaccg	ctgtgctcac	cgaagaggtg	tcggacgggg	12420
ccgcgctcgt	gctcgcggg	cgcgaacgcg	ggctctcgt	gccgggcgac	ctcgccgtcg	12480
tctcgtcgg	tgccgctacc	cggtcggcac	cggacgacga	cgtggcgctc	accggtttcc	12540
gcaccccag	cgcgagatg	gggcgcggg	cgggtgcaggc	gctgaccgag	gtgctcgaaa	12600
acggcaccac	accgcaagaa	ctgctccgt	gcgagttcgt	cgagggtcg	acgctggcg	12660
caccacgcct	ttgaccagga	ggaactgttg	ctcgaccaca	ccacggacgt	tgtcgtcgtt	12720
ggcgcgggac	tcggcggtgt	cgcgcgcga	ctcgcggtgc	tgcgcgcggg	ccgcgggtc	12780
gtgctcaccg	aggagtacga	ctggctcggc	ggccagctga	ccagccaggc	cgtgccgcc	12840
gacgagcaca	gctgggtgga	gcgcttcggc	gtcaccgcga	gctaccgggc	gttacgcgac	12900
ggcatccgcg	actactaccg	ccgccactac	ccgctgaccc	cgcgcgcacg	ggcgtggcg	12960
gagctcaacc	ccggtgcggg	caacgtgagc	aggctctgcc	acgagccccg	cgtcgccgtc	13020
gcgggtgatcg	acgagatgct	ggcgccgttc	cgcggcagtg	gcaggctgac	cgtgctgcag	13080
ccgtaccggc	cgggtggccgc	gcacaacgac	ggcgaccgga	tcgtgtcgg	gaccgttgcg	13140
caccgcgaca	ccggtgaaca	gatcgagctc	tccgcgcgt	acatcctgga	cgcgacggag	13200
acgggtgaac	tgcttcggtt	gtccagcagc	gagtaagtc	ccggttcga	gtccactctg	13260
gacaccggcg	agccgagtc	gcccgaagtc	gcgcagccgg	cgaacatgca	ggcggtgtcg	13320
gtgtgcttcg	tggtcgacca	cgtcgacggc	gaccacacca	tcgacaaacc	ggcgcggtac	13380
gacttctggc	gcgcgtacca	gccggacttc	tggggcgacc	ggatgctgtc	gttcgctcc	13440
cccaaccgcg	gcacgctcgc	gatctccgaa	cgtacgttca	ccccgaacc	ggacgacgac	13500
ccgctcggcg	ctgtgtcggg	ccagcggctc	agtgcgggtg	acagcaatct	gtggacgttc	13560
cggcgcatcg	cgcgcgctcg	caacttcgtc	gagggtgcct	acgacagcga	catctgcctg	13620
gtgaactggc	cgatcatcga	ctacttcgag	tcgcccgtga	tcgacgtgcc	ggacgccgac	13680
gcgcacatcg	ccgcggcgcg	ggaactctca	cgttcgggtg	tctactggct	acagaccgag	13740
gcgcgcgcgc	cagaaggcg	caccggcttc	cccggcctcc	gcctgcgcgg	cgaagtcacc	13800
ggcagcgcg	acggtctcgc	gcaggcgccg	tacatccgcg	agtcaggcg	catcagggcc	13860
gagcacacga	tcgtcgaaca	ggacctctcg	ctcgccgtgc	gcggcgacaa	gggtgcgggtg	13920
cagcacgccg	acgccgtggg	tgctggcatg	taccgtatcg	acctgcacc	ctccaccgg	13980
ggcgacaact	acatcgacgt	cgcgagctgc	ccgttcgaga	tcccgtcgg	cgcgctgatc	14040
ccgcaacggg	tggagaacct	gctaccgcgc	ggcaagaaca	tcggcaccac	ccacatcacc	14100
aacggttccc	accggtcgca	cccagtcgag	tggaacgtcg	gcgaggtcgc	gggcgcgctc	14160
gctgccttct	gcctggcgca	ccgagtcacc	cctcgcgcg	tgcgcaatac	ccctggcctg	14220
ctcgcggaact	tccagcagtg	tctggaacgc	gacggggctg	agctccgctg	gccggacgtg	14280
tccggtact	gacgcaggga	gacgaaaatg	acaaagctgt	cacgacgact	cacggcactc	14340
atcgtcgag	ggctgttcgc	cctcaccggc	tgcgggtggtg	gatcaaccgc	acagtcggga	14400
ccgaagtcgc	tgcgcgatgac	cgtgtggaact	gccaacgcgg	cgcactctca	gctgctcaac	14460
gacatcgccg	ccgagtacaa	ggcctcgcac	ccggacatcg	ccgagatcaa	gttcgactcg	14520

gtgcccgcgcg	acggetacac	caccacgctc	accacccaga	tcgcccgcgcg	taacgcgcgcg	14580
gacctggcct	ggatcctgga	ggagtcggca	cggacttcg	tggcgtccgcg	tgcgtctgcc	14640
ccggtgcgcg	gcaagatcga	gaaggccgac	gagctcgtgc	cgccgcgcgac	gaagctgtgg	14700
gagaaggacg	gcgaactgta	cgctaccgcg	ttctccacct	cgccgttcgcg	cttggttcgtc	14760
aacaccgacc	tggatgaagg	cgctcggcg	gactggacct	gggaccaggc	gacgcgggct	14820
gcctctgcgt	cggcggccgc	ctccggcaag	ggcggcctgg	tactgccgga	cttcaagtac	14880
cagaactggg	cagtgtctgc	ctctatctgg	cgcggctggg	gagctgatgc	gtggagcgcg	14940
gacggtcgct	cgtgcggggt	ctccagcagc	gagatgaacg	acgcgatgtc	cttcttgcac	15000
aaggccatct	tcaccgacaa	ggcgattccg	ggccccggca	cgacggtgga	cttcttcgcc	15060
ggcgacgcgcg	cgatggcgat	cgccagatc	tcccggttcca	gtgcgttgaa	ggacgcgaag	15120
ttcggttgga	cgtgctgcc	gctgccggcc	ggtccgaagg	gtgactacgc	ggtgatccgg	15180
caggccggga	tcggtgtgct	gaagcagtcg	cacaacgtcg	acgcgcgcgac	ggacttcctc	15240
gccttctca	ccaaccagac	caactccgcc	aagctcgcgc	agttcttccc	cccggcgcg	15300
tcgtcgtgc	tcaacgcgga	gacgtcgcgc	aagagcaacc	cgttgatcaa	ggccgagcaa	15360
ctgcagtcgc	tcgtcgtcga	cgccatcaac	aagggcgctc	tgaagccgag	ccacaagggg	15420
caggaggagc	tgaaccagac	gatccgcgcgc	gcgctcgacc	cgttgtggaa	gccggacgcg	15480
aacgtgcaga	acgtgctgaa	cgacgtgtgc	accaagatca	aaccgctgct	ggagaacaag	15540
tgacggcggt	cgcacactcc	acgcggggccg	tagcccgcaa	ggggacgtcg	tactggacgc	15600
agcgcaggcg	cgacaatctg	gttgggtacc	tgttcgtcgc	gcccgcgctg	ctcggcagca	15660
tcgcttcgt	gctgggtgcg	ctggccttgg	tcggttggtg	cagcctcaac	gagtggaacg	15720
tgctcgcgcg	cacgttcgag	ttcgtcggcg	cgcagaacta	ccaacagctg	ctcgcgcgacg	15780
agaagctgcg	cgactcgtcg	gtggcgacca	cttggttcgc	cgccggcctg	gtcgtgctca	15840
acctgtcact	agcgtgctg	ctggcgtgc	tgctcaacca	gaagctgagc	ggcaccacgg	15900
tcttcgcac	gttggtcttc	tctcccgctc	tcgtgctcgt	ggtggcggtg	acgctggtgt	15960
ggcagctgat	actgcagcgc	gagggcagcg	tcaacggact	gctcgggttc	ttcggtgcgcg	16020
acgggcccga	ctggctgcgc	ggtgagtcga	ccgcgatggt	ctcggtgatc	gtcgtgaccg	16080
tgctcaagaa	cgtcggcctg	aacatggtgc	tgttcctcgc	ggcgctgcaa	ggcgtgccgc	16140
agcgttgta	cgaggcggcg	aagatcgacg	gggcgggtgc	ctggaccgcg	ttccgcgcga	16200
tcaccttgcc	gttgatcagc	ccgacgatcc	tgctcacgtc	gatcatcacc	atcgtcggct	16260
cgtgcagggt	gttcgcgcag	atcgcgggtg	tcacgcaggg	cggtccgggc	acgtccacga	16320
ccgtactgat	ctactacctg	taccagcagg	cgttccagtt	ccaccacttc	ggctacggcg	16380
cgacgatctc	ggtactgctg	ttcgtcatcg	tcgccgcact	cacctgctg	cagtggcaga	16440
tgccgcggaa	gtgggtgctg	catgaggctt	agggtaaga	tcacgctata	cgggctgctg	16500
tgctgctgt	gcgtgccttt	cgtgttccca	acctggtgga	tgatcacctc	gtcgatgaag	16560
cccatcagcg	agatcttctc	cacctcgccg	ctgccgtcgg	agtggacggt	ctccacctac	16620
cggcagggtg	tcgagatgca	gccgttcgcg	cagcagtaact	ggaacagcct	ctacatcgcg	16680
gtgatcgtca	cgacaggcac	aatggcggtg	gcggcgatgg	ccggatacgc	gttcgcgcgt	16740
atccggttcc	cgggccagaa	cgtgctgttc	gtggctcgtc	tgatcggcct	gctcatcccg	16800
agcgagggtca	ccatcgtgcc	gctgttcaag	atgttccagt	cgctcggcct	gaccaacacg	16860
cactggccgc	taatcatcgt	gccgatcttc	ggggcgccct	gtgtgctggc	gatcttcac	16920
atgcgccagt	tcttcacgcg	cctgcgcgtg	gagctggagg	aggccgcgcg	gatggacggc	16980
ctcggaacag	cgggcatctt	ctaccgggtg	gccctgccgc	tgtcccggcc	cgcgctgggc	17040
gccgtcgcga	tcttcacgtt	cctgcactcg	tggaaacctc	acctggagcc	gatcgtctat	17100
ctgtccacac	cggacatgta	cacgttgccg	caagcgtcga	cgcagttcgt	cgacaactac	17160
ggcgggccga	tgtggaacgt	gcagctcgcc	gccgcgacca	tgaccgcagt	gccgattctc	17220
gtcgtgttcg	tgctggcgca	gcggcagttc	atcgagggac	tcgcgcacac	cggggttaag	17280
gggtgagtc	cgcgatcgac	ccggagatcg	ccgcgctggg	agacctcgcc	agaccaccgg	17340
tgacgccagc	gggaatcgac	gcggctccggg	ccggaggacg	cgtcgtcacc	gatgccgagc	17400
tgacgcgcgcg	tggcaccgtg	acgttcgcgcg	atgccgatgc	cgatggcggtg	cccgtgcttg	17460
tgctgcgcgc	agcgggtgtg	ccacgtcttc	cggtgctgca	cctgcacggc	ggcgggatgg	17520
tcgcgggcac	ccggcgacc	gacctgcacg	tgctggccga	gtgggtgtcg	gagctgggtg	17580
tcgtgctggt	gtcgcgggag	taccggctcg	cacccgagca	cccgaccccg	gcgccgctcg	17640
aggactgctt	ccgggtgctg	gagtggtatg	cccgcgaacg	cttcggccccg	cctgtcgttg	17700
cgggtacatc	ggcgggcggc	gggtggcg	ctgcggtgac	gctgatggcc	cgcgacctcg	17760
gcggctccgc	gatcttgccg	tcggcgcgca	actgctcgaa	cgcgtccagc	gtctccgcca	17820
acggcgtgct	accgcgccag	tcgacgaggt	agacgtccag	gtgatcgggtg	cccaaccgcc	17880
gcagactgcg	ttcgcacgcc	tcgacggcgc	cacgcgcgacc	cgcgttgtgc	ggatacacct	17940

tgctgaccag	gaaaacctcg	tgcgggcgcc	cggcgatcgc	ggcaccgacg	acctcctcgg	18000
cgcccccgct	gccgtacatc	tcgggcggtg	cgatcagccc	caggccgagg	tccaggccgc	18060
gccgcagcgc	ggcgacctcc	gccgcgcgct	gccccagccg	ctcccccatg	ccccagggtg	18120
cctgccccag	caccggcaat	tcttgcgcgc	caecgagttg	aaggcctcgc	atgcacactc	18180
cgttttcagtc	agcgctgctg	cggcagcacg	gccaccagct	cgaagccacc	gtcctcggac	18240
ggccccggcg	ccaaccgccc	accggccatc	tgcacccgct	ccgacaggcc	ggccagcccg	18300
gaccgcgcgc	tgcgacctc	gatggccggt	ccccgcgggt	cgggggcgcc	gtttgtgacg	18360
gcgacgtgca	gcgagccctc	gcggaacacc	agcgcacact	tgatgtcagc	accgggtgcg	18420
tgcttggaag	cgttcgtcaa	cgccctcctg	acgaccgggt	aagccgcgcg	ctcaaccgca	18480
ggcgacaccc	cgtgcgggtc	gcggatctcc	gaggaaagct	ccacatccac	accggcgggc	18540
cgcgccccga	cgaccagctc	cgggatcgtg	ctcaaccggg	cccgtgcct	gggggcgccg	18600
agccccgagc	tgcgcgcgat	ctcgtccagc	gcctgcttcg	ccaaccggcg	cagccgcccc	18660
gcgggtctcct	tgcgaccggg	atcctcgggt	gtggccgcca	acgcgcgcga	ctcgaccgcg	18720
attaaggtca	cgtgatgtcc	caccgcgtcg	tggatctccc	gcgcgatccg	ggccccgtcc	18780
tccgcgcgcg	ccgtctcggc	cttcgcctgc	aactccgcct	cgggtggccgc	ctccagcttc	18840
cgcagactgt	ccgccagctg	ctcccgcac	gccaccagcg	cccccaatgc	cgtcggcgcg	18900
cctgccgcca	gcagcacgaa	cgccacggtc	aggatgatcg	acccgacccc	cagcgactgc	18960
atgatcatca	ccggtgccac	ggcgaccgcc	gcggtcagca	acaccagccc	gaccaacatc	19020
tggatccgcg	gctgcgcgcg	ccccaacgcg	tacaacgcca	cgaccgtcgg	cgccccaaccc	19080
aaaccaccgg	ccaacgctgg	catgcacagc	agcaccgcca	tccgcggcca	ccgcgcgaac	19140
ggcagcagcg	ccgaagccac	caaaccggac	accgtcgcct	agccgaacgg	gtcggggcgcg	19200
gccagcacag	ctgccgcggg	aatcccgcgc	accagcgccct	caacgcccag	ccgagaccag	19260
cgcaccgaac	tcaccggaag	ccgcccgcga	cgcgctgcgc	gatcaacgcg	gcctgcaccc	19320
ggttctgcgc	gccgagcttg	ctcaacaccg	tgcacagcta	gctcttgacc	gtcgcctcgg	19380
tcagcccag	ccggaccccc	atatcgcgct	tggaccgacc	atccgccaac	aactggagca	19440
cctgccgctc	ccgcccggac	aaccctcgca	ccagctgcgt	ctcgtgcgcg	ttgtcggaca	19500
gactgcggaa	cctgggcaac	aaccgcgcag	tgatccgcgg	atccagcacc	gccccaccgg	19560
ccgccagatc	gtgcaccgcc	cgaaccagca	ccgcgggctc	cgcgtccttg	agcaggaacc	19620
cgtgcgcccc	gaaccgcaag	gcacgcggca	cgtaatcgtc	caggtcgaac	gtcgtcagca	19680
ccgcgggcac	cggcggatcc	gccaacgtcg	ccaagtcccg	caacgcgcgc	agcccgctct	19740
tgccgggcat	ctgcacgtcg	atgagggcga	cgtcgacgcg	gtacgcgcgc	accgcggcca	19800
gcaactcate	cccgttgccc	gcctcggcga	ccaccgggat	cgagccgtcg	ccctccaaca	19860
acaccgcgag	gccacgcgcg	agcatcgctt	cgtcatcggc	aagcacaacg	cggatcgggc	19920
ccccgcgcgc	gtcagcccg	acctctcggt	cacctccctg	ttccgagggg	cgccagcaga	19980
ctagcggggc	cgcgaaagcg	cagcgcacac	gccacccgag	cgcactgtgt	cagcggcgcc	20040
cgccttgggc	cttcgcgtcc	cgcaccgcga	ccgagatccg	caccgggcta	cccacgaacc	20100
cgaacgtctc	ccggaacctg	cgctccagga	accgcgggta	cccgccctcc	aagaaccggg	20160
tggatgaacag	cacgatcgtc	ggcgccgcgc	actgcgcctg	ggtggcgaac	aggatcttcg	20220
gctgcttgcc	gccccgcacc	ggcgccgggt	tggccgcgac	cagctcggaa	agccaaccgt	20280
tcaaccggcc	ggtggagatc	cgggtgtccc	acgaatccag	cgcctgcgcg	agcgtcgggg	20340
ccagtttcgc	caccgcgcga	ccggtcttcg	ccgacacgtt	gaccgcgtcg	gcccaccgca	20400
cccgaccag	ctcgcggtcg	atctccttct	ccaactgggt	gcggcggtcc	tcgtcgacca	20460
ggtcccaact	gttgtaggcg	atcaccaatg	cccagaccgg	ctcgacgacc	atagtgatca	20520
cccgacggtc	ctgctcgctc	aacggctcgg	agcgtcgat	gagcacgatc	accacctcgg	20580
ccgcctcgat	cgcggccttg	gtgcgcagcg	acgcgtagta	ctcggtgccg	cttgcggtct	20640
tcacgcgctt	gcgcagcccc	gcgggtgtcg	cgaaccgcca	cacctggccg	tccagctcca	20700
ccagcgagtc	caccgggtcc	accgtgggtg	ccgcgacgtc	gtgcaccacc	gaccgctctt	20760
ccccggtcag	cttggttcagc	aggctcgact	tgcacacgtt	cggcttgccg	accaatgcca	20820
cccgccgcgc	cccaccggtc	gcgcgcgaag	tctcgcgcgc	cgtctccggg	aacacctcca	20880
ggacggcgct	cagcaggtca	ccggaaccgc	gcccgtgcaa	cgcgctgacc	ggcatcggct	20940
cgcaccaacc	cagcgaccac	agcgaatgca	cgtcggagac	gcctcgctgg	tcgtcgacct	21000
tggtggcggc	cagcagcacc	ggacgcttgg	accgcgcgag	cacctgggcc	acggcttcct	21060
cggctctcggt	ggcaccgacc	cgggcgtcca	ccacgagcag	caccgcacgc	gcgggtgtgca	21120
tggccagttc	cgcctgcgcg	gccaccgacg	cctgcagctc	cttcgcgtcc	ggctcccagc	21180
caccgggtgtc	gaccaccgtg	aagcggcgcc	cgttccacaa	cgcgtcgtag	gccacccgat	21240
cccggggtgac	accaggggtg	tctgcacgca	cggcttcccg	acggcccagc	agccgggttc	21300
ccagcgtcga	cttgcccacg	ttgggacggc	cgaccacggc	cagcaccggc	tgccgcttcg	21360

tcgggtcctc	gcectcgacc	gettccgacct	cgtcgaactc	agcccactca	gcctcgtcgg	21420
accacgtgcc	gtccaggcct	tccaccgact	cgtcgggtcac	gtcgtgttcc	ctctcgaata	21480
gtcttggtc	tggtccgcga	ccagccgac	cagctcggcg	atcagctcga	ccagttcgg	21540
gcgcaccgcc	tcggtcgcca	cgaccagccc	ggcgcgccct	ttgcccgcgc	gcagcacgat	21600
cggctccccg	aacaacacgt	cgatcctcgg	tagcagccta	cgccccgggc	catccggggc	21660
gcgcgtgccc	cggcaggcca	ccggcaggat	cagcgccctc	gacgtccgcg	ccaaccacgc	21720
cgcaccgtgc	tgcgcattgg	tcacatcgcc	atcaccccgg	gtgcccctcc	ggaacacccc	21780
gacgagacca	ccggcccgc	gcaccgcac	cgccgcagc	agcggggcgc	ggtccggcgc	21840
accgcggcgc	acccgatct	gcccgatgcg	gcgcaggaa	cagcccagcg	caccgcggaa	21900
catctcctgc	ttgatcagga	acaccgcgtg	gcgcgggac	attccgaaca	gcagcggccc	21960
gtccatcate	gaactgtggt	tggtccaccag	taccaccggg	cccggtgcgc	ggatccgctc	22020
cgcgcgtgg	atccgcaccc	ggtacggcag	ctgcacgatc	cggcgcgaaa	tccactggcc	22080
gcaccgggtgc	attccaccgg	acgcgcctc	gggcagggtc	tcgtcgctca	tggtcgctc	22140
cgtccgcgcg	cgaccagcag	gccacggcac	tccacgtgct	tgcgcaactg	cgtgagcacc	22200
tccaccacac	ccaggtccgt	ggtgtcgagc	tccaccgcgt	cgtcggcctt	gcgcagcggc	22260
gccaccttcc	gccccgagtc	cagcgcatcg	cggcgctgca	cgtcgcgcgtg	ggtccgggtc	22320
aggtcaccgg	cccgtccctc	ggagacgtcc	tgcgcctgtc	ggcgctgcgc	gcgggcgtgc	22380
gcggacgcgc	tcaggtagac	cttcaaacc	gcatccgggg	ccaccacggt	gccgatgtcg	22440
cgtccctcga	cgaccatgcc	gcctggcgac	accagcgct	caccgatcag	cttccgctgg	22500
tggtcgacca	actgctccc	cacctcggcg	accgcgcaca	ccgcgcacac	cgcgcgggtc	22560
acctccggcc	cgcggatctc	ccgccccacg	tccgagccgt	ccaggaagat	ctcagggccc	22620
tccggatcgg	tgcccaccgt	cagccgcgt	gcgcgcacca	cgctgccac	tgcgcccgga	22680
tccgacgggt	cgacctcggc	gcgcagcacc	gccagcgtca	cggcgcggtg	catcgctccg	22740
gtgtcgaggt	aggtagcccc	caatgcgaac	gccaacttgc	gggacaccgt	cgacttgccg	22800
gtgcccgaag	ggcgtcgag	cgccaccaca	ccaaggagcc	tggtgtgtgc	cacgtgcatg	22860
tccttcccga	gcccgaaccg	atcgggccga	caccgcggcg	gaccaaccgt	ccattctgcc	22920
tggtccgctc	ctgcccgatcc	caatcgcatc	cagatccaat	ccggactgcg	ggacaaatac	22980
gaaagtctta	cgaataaggt	cttggtgtgtg	gatgttaactg	tgacccccct	gccagggctc	23040
ggcacgcagc	aggacttcac	cacccgatcc	ggccaccgca	tcggcggtgat	cacctaccgg	23100
gacggccgct	tcgagctgat	cgtctccgac	cacgaagacc	cagacaaggt	ggccgcctcg	23160
gtcgccctga	ccacctccga	gaccagcacg	ctggccaacc	tgctgggcgc	cccgcagctg	23220
gtcgcccagc	tcaacgagca	gcacagcgag	gtcgccggga	tcaccacctg	gcagctgtcc	23280
gtcgccccgg	gctcccccta	cgccggccga	accctcggcg	acacggagat	gcgcacccgc	23340
acctccgtgt	cgatcgtcgc	ggtcgtccgg	gacggcacccg	tgacccccct	accgcggccg	23400
gacttccagt	tctccgcggg	cgacctggtg	gtggtcgtgg	gcaccgcgaa	ggggctacgc	23460
gcagccagcg	aaatcctgga	aaagggctga	tccggcccgt	cccgaacact	ttcccggcca	23520
cctgaccggg	acacgcgtca	ccaacggcgg	tccagcgcg	gccgatcccc	taacaactcc	23580
atacgcaggg	cacacgcgag	aggaaacacg	ttgcaagaca	cggcgatctc	cctaatagaa	23640
ctgggtgcgg	ttttcttcgg	tctgggcac	ctcgggagac	tcgcatggaa	aatcgggggtg	23700
tcaccgatcc	cgtctctacct	gatcgggcgg	ctggccttcg	gcaccgggtg	cctgggtccc	23760
ctgcacggga	tcgaaccgtt	caccacctc	gcctccgaga	tcggcggtgtg	cctgctgttg	23820
ttgctgttag	gcctggaata	ctccgcgggt	gaactcgtca	ccggcttacg	ccgctcctgg	23880
ctggccgggtg	tcatagacat	cgtgctgaac	gcggtaccgc	gtgcgctggt	ggccctgctg	23940
ctgggttggtg	gtccgctcgg	cgcgttcaca	atggccggcg	tcacctacat	ctcttctctc	24000
ggcatcatcg	cgaaggtgct	cggagacctg	ggtcggctcg	gcaaccggga	aacgccgggtg	24060
atcctgtcga	tcctggtctt	cgaagacctg	gcgatggccg	tctacctgcc	gatcctgacc	24120
gccgtgctgg	ccggggtcag	cttctctcgg	ggactgaccg	cggtcgggg	gtcgctggtc	24180
gtgatcacc	tggtgctggt	ggtcgcgctg	cgttccggca	agtacgtgtc	cgcgctggtc	24240
gacagccccg	acccggaggt	cttctctgctg	cgcctgctgg	gggcggcgct	gctcgtcgcg	24300
gggatcgct	cggagctgca	ggtctcggcg	gcggtcggct	cgttctctgct	gggcatcgcg	24360
atctccgggt	cgaccgcggc	gaacgcgacc	cgcgtgctgg	agccgctgcg	cgacctgttc	24420
gccgcgctgt	tcttcgtcgt	gttcggcctc	aacaccgatc	cgagccagat	cccgcgggtg	24480
ctgcgggtgg	cgtgctgct	ggcggtggcg	acctgcgcga	cgaaagtgt	caccggctgg	24540
ttcgccgccc	ggatgcaggg	tgctcgccgg	atgggtcggc	tgcgggccgg	tgccgcgctg	24600
gtggcgcgcg	gcgaattctc	catcgtgatc	gccgggctgg	ccgtcgctc	cggcgcggtg	24660
ccgggcgagc	tcgcccctc	cgcaccgc	tacgtgctgc	tgatggcgat	cgtcggcccc	24720
gtcgcgcccc	gcgtcgtcga	gccggtggcc	cggatgttcc	tccccagcca	ggcgaagaag	24780

gcctgaccgg	aaaagcctcc	ggctgtcccg	agcggacggg	cgggaggett	tctcaacget	24840
gcggataacg	cgggcgggtc	tggcaaacgc	aacaccgggtg	cgcgaaacagc	ctcagaggcc	24900
caactgcgcgg	tagagcgagc	cgatctcctg	gcgggttcaac	ggccggatcg	cgcccggggcg	24960
ctcgttggtc	agccgcacat	cgccgatccg	cgtccgcacc	aggcgtgca	ccgggtagcc	25020
gacgtgcttg	agcagccgcc	gcacgatgcg	gttgccggccc	tcgtgcaaca	cgatctccac	25080
cagcgaccgg	ttctggttca	tgctgaccag	cttgaaccgg	tccaccttca	ccagaccgtc	25140
ctccagctcc	acgcctcgcg	gcagctgctg	cccagggctc	ttcgggatcg	accccagcac	25200
ctccgccagg	tacgtcttgc	gcaccttgta	cgacgggtgc	atcagccggg	tcgccagctc	25260
gccgtcgctg	gtgatcagca	gcaggccctc	gggtgcctgg	tccagccgcc	ccacgtggaa	25320
cagcttgccc	tcccgttccc	gcaggtaatc	accgatgcac	ggacgcccct	tgtcgctcga	25380
catggtgcac	aggatgccgc	gcggcttggt	cagcagcagg	tgcgtcagat	cgtcgctgac	25440
catcaccggg	ttgccgtcca	cgtggaccac	cgcggtcgtc	gggtcgaccc	ggcgccccag	25500
ctcggtgacg	acctcgccgt	cgacctcgat	cgccccctcg	acgatcatct	cctcggccgc	25560
gcgccgcgag	gccaccccg	cctgggacaa	cactttctgc	agccgcacgc	cttccgaatc	25620
ggcagtgcctg	ctgtacgggg	aacggtgctc	agacgtcatc	aatcgaatcc	acttcggggca	25680
acaagggggc	gagcggcgcc	aactccttca	acgacgacag	ccccagccgc	tccaggaaca	25740
gctcggctcg	gcagtacagg	atgccgcccc	tctccgggtc	ggttccggcc	tcttcgataa	25800
ggccgcgccc	caccagggtg	cggatgacgc	cgtcgacgtt	cacaccccgt	actgccgcga	25860
cccgcgaacg	cgtcaccggc	tgccggtagc	cgatcacgcg	gagggctctc	agcgcggcac	25920
gcgtcagctt	cgaacgctgc	ccgtccaaca	ggtaccgctc	cacgtacggg	gcgtacttct	25980
cccgcgtgta	gaaccgccag	ccgtcgccga	cccgcgcgag	gtcaacgccc	cgttcgcgct	26040
cggcgtagcc	gtccgagagc	cgccgcagcg	cggaccggat	ccgggccacc	ggctgctcca	26100
gggtgctcgc	cagcagctcc	tcgccggccg	gcacgtcgac	cacgagcagc	aacgcctcca	26160
gcgccgcatac	cagcgccgaa	tcggaggctc	ggtccggcgc	actcggcgcc	tccaccgcct	26220
cggaatcccc	agcggccgcc	gacggctcca	acggttcctg	cggctcagcg	ggcggcgggg	26280
tcggcgactc	ctccgcgacc	tcgcccgccg	cctccggctc	cagctccgtc	acccgtactc	26340
ctcttcttca	tggttgggcg	gctgcgcctc	ggcttcggcc	tcgcctgcg	ccacgtgcc	26400
gcccacccag	ctcacgatca	gctcacccag	cggggctctc	tgctcgaaca	gcaggacctt	26460
ctcccggtag	agctcgagca	gcgccaggaa	ccgcgccacc	acctcgacgg	tgtgcccgca	26520
gtccgacacc	agctccgaga	acgtcgcgct	gcccttctcc	gccaaccgca	cccgcagcag	26580
cgcgcgctgc	tcgcgcaccg	aaacgccgtg	ctggtggatg	tggtccagcg	aaacggtcgg	26640
cgggtggcttc	ggccggaaca	ccgcggccgc	gatctcggcg	aaccgctgcg	gcggaacccc	26700
gatcaccact	tccggcagca	ggttcgcgaa	ccgctcctcg	accgacaccg	aacgcggata	26760
gcgcgcgacg	gccccggcct	ccaactcgcc	gaacagcgcg	gccacctgct	tgtacgcgcg	26820
gtactgcagc	agccgcgcga	agagcaggct	gcgggcctcc	agcagcgcca	ggtccgcctc	26880
gtcctcgacc	tccgcggccg	gcagcagccg	ggccgccttc	aggtctaaca	gcgtcgccgg	26940
gaccaccagg	aactcgggtg	tttcggttcag	gtcccaccgc	tcgccgagcg	ccttggtgta	27000
ggcgatgaac	tcgtcgggtg	ccttggtgcag	cgctacttcg	gtaacgtcca	gctggtgctg	27060
cgagatcagc	tgagcagca	ggtcgaaggg	gcctcgaag	ttgtccagcc	gcaccgtgaa	27120
ccggccgcct	cggcggggat	cctcgctcga	ctgcgcgcgc	ggtaccgcgg	ggtctgtcac	27180
tctccgggct	cctcagggcg	ccgcaccagc	accgagtcgg	cgccgttctt	gtcagagtcg	27240
gcgagcacca	cggcaaccgc	ttcgcgccac	acgcggcctc	ggtccacggc	gatgccgtgg	27300
tcggccccga	atgccagccg	cgctgctcc	aagcccagca	actcctcgtc	ggacacgtac	27360
acgggtgatct	tcgaatcgctg	cttgcgccgt	ccagagccgc	cccggcccgc	cgcggtgcc	27420
gcctgctccg	ggtccggcgg	attcgctga	tccgtccgag	gaacagtagt	acggaacaat	27480
tcggccgctc	cgggcagggc	gaccgcagc	gtcatcgggc	gatcacctcg	cgcgccagtg	27540
cgcggtacgc	ctgcgccccg	gccgagcggg	gcgccagcg	ggtgatcggc	tcgccggcca	27600
ccgtggtctc	cggaaaccgc	accgtgcggt	tgatcacgc	atcgaagacg	atgtcgccga	27660
acgcctcgac	gacgcgcgcc	atcacctcgc	gcgagtgcag	cgtgcgcggg	tcgaacatgg	27720
tcgccaggat	gccgctgate	tccagcctcg	ggttcagccg	ctcccgccac	ttctcgatgg	27780
tgctgatcag	cagcgccacc	ccgcgcaggc	tgaagaactc	gcactccagc	gggattatca	27840
cggcgctccg	ggcggccaac	gcgttcaccg	tcagcagccc	cagcgacggc	tggcagttcca	27900
ccagcacgta	gtcgtactcc	gccagcgccg	gctgcagcac	ccggtgcagc	gtctgctccc	27960
ggcccacctc	cgcgaccagc	tgcacctcgg	ccgcggacag	gtcgatgctg	ctgggcagca	28020
ggtccatgcc	ctcgacgggtg	gtctgccgca	ccacgtcatg	gatggcgacc	ggccgttcca	28080
tgatcacgtt	gtagatggct	tggtcgagct	ggtgcggctg	gaccccgagg	ccgaccgaga	28140
gcgcgcctcg	cggatcgaaa	tccaccagca	gcacccggcg	cccgtattcc	gccagcgctg	28200

cgccgaggtt gatcgtcgac gtggtcttcc cgacgcgcgc cttctggttg cacatcgcca 28260
gcaccgatgc gggaccgtgc cgggtccagca ggcgcggctc ggggatgtgc cgacgtggcc 28320
ggccagtggg accgaggccg cgggggttcg ggcgcaggcc gacctcctcc tcgcggcccc 28380
ccgtctcccc ggcgatgctc aggtcgaccg cgcgccggga ccgcccttcg ggcgcgggct 28440
gcggcagcga catggcgatc tgactccttt tgggtgcgggt ggcgatcaaa cgcagcctaa 28500
gtggcattcg ttaccagcgg caacgcgcct cgcggtggtg tcggaagtcc cctgtgatct 28560
gcgtgtgatc aacgtctacc gcgtacacca cccctcgca ttcgcagcgt caccaagtca 28620
ctccgtagcg tgtgcgcgcg gatgcgtcgt cgcgtagacc tcccgcagcg tgttcaccgt 28680
gatcaagggt tagacctggg tcgtcgtgac cgaggcgtgg cccagcagtt cctgcaccac 28740
gcggacatcc gcgcgcgcct ccacaagggt cgtggcgaaac gaatgccgca gcacgtgcgg 28800
cgaaaccgag ccgttgatcc cggcgcgctg cgcggcggtc ttcaacgcgt tccacgagct 28860
ctgccgggaa agccgggtac cgcgcgaatt caggaaacac gcggcactac cccgccccgc 28920
cgcggccagg ccgggcctgg cccgtaccag gtacgcgtcc agcgcgcga gcgcgggtcg 28980
gccgatgggc accagccgct ggcggccgcc cttcccttcc agcagcacgg tcgggttggg 29040
gccgtcgatg tcgtcgaggt ccaacccgac cgcttcggag atccgcgctc ccgtcgaata 29100
cagcacttcc agcagcgcgc ggtcccgcag gcccgcggca tcctcgcccc cggcgtgatc 29160
gagcagcttc ccgacgtcgc cgatggaaag cgccttcggc agccgcttcg gcgggctcgg 29220
cggcgcgaca tcgcgcgcta cgtcgaccgg cagcagcccc tcggcgtgcg cgaagcgggtg 29280
caggccgcgg gcggccacca aagctcgggc cgacgacgac ggcgcagcgg cgggcccgtg 29340
cccgtgctt tcccggagct ccgccaagaa cccggacagg tgctccgaac gcacctcgcc 29400
gagcccagaa atccctgccc cgaccaggaa ttccggcatac cggcgcaggt ccctggcgta 29460
ggagtcgaga gtgctgcggg cgggtaccgcg ctgcagggca aggtggtcga ggtaccgggt 29520
gatcgcgccg cgcaggtccg gcggcagctc ctcgaaaccc ctaccgggc ggcgaagcgc 29580
tggggccggg ccggccattc ggcatccgcc gggcgaggct ccacccggcc ctgcgcggac 29640
gcgtgggcgg cgagcagccc cgcaccccgc gggcgcgtga cgatctcccc ggccagcggc 29700
atccgcaccg cctcggcgag cgggaagcgg cggatc 29736

<210> 7

<211> 828

<212> DNA

<213> *Saccharopolyspora spinosa*

<220>

<221> CDS

<222> (1)..(825)

<223> ORF1; O-methyltransferase

<400> 7

gtg ttg cca ggt ggc gca cca aca tcg cag cag gtt ggg cag atg tat 48
Val Leu Pro Gly Gly Ala Pro Thr Ser Gln Gln Val Gly Gln Met Tyr
1 5 10 15

gac ctg gtc acg ccg ttg ctg aac tcg gtc gcg ggc ggc ccc tgc gcc 96
Asp Leu Val Thr Pro Leu Leu Asn Ser Val Ala Gly Gly Pro Cys Ala
20 25 30

atc cac cac ggc tac tgg gag aac gac ggg cgg gct tcc tgg cag cag 144
Ile His His Gly Tyr Trp Glu Asn Asp Gly Arg Ala Ser Trp Gln Gln
35 40 45

gcc gcc gac cgg ctc acc gac ctt gtc gcc gaa cgg acc gtg ctc gat 192
Ala Ala Asp Arg Leu Thr Asp Leu Val Ala Glu Arg Thr Val Leu Asp
50 55 60

ggc ggc gtt cga ctg ctc gat gtg ggg tgc ggt acc gga caa cca gcg 240
Gly Gly Val Arg Leu Leu Asp Val Gly Cys Gly Thr Gly Gln Pro Ala

65	70	75	80	
ctg cgc gtc gcg	cgc gac aac gcg	atc cag atc acc ggc	atc acc gtc	288
Leu Arg Val Ala	Arg Asp Asn Ala	Ile Gln Ile Thr	Gly Ile Thr Val	
	85	90	95	
agc cag gtg caa	gtg gcc atc gcc	gct gat tgc gca	cgc gaa cgc gga	336
Ser Gln Val Gln	Val Ala Ile Ala	Ala Asp Cys Ala	Arg Glu Arg Gly	
	100	105	110	
cta agc cac cgg	gtg gac ttc tcg	tgc gtc gat gcc	atg tcc ctg ccg	384
Leu Ser His Arg	Val Asp Phe Ser	Cys Val Asp Ala	Met Ser Leu Pro	
	115	120	125	
tac ccg gac aat	gct ttc gac gcc	gcc tgg gcc atg	cag tcg ctg ttg	432
Tyr Pro Asp Asn	Ala Phe Asp Ala	Ala Trp Ala Met	Gln Ser Leu Leu	
	130	135	140	
gag atg tcc gaa	ccg gac cgt gcc	atc cgg gaa atc	ctt cga gta ctc	480
Glu Met Ser Glu	Pro Asp Arg Ala	Ile Arg Glu Ile	Leu Arg Val Leu	
	145	150	155	160
aaa ccc ggt ggc	atc ctc ggc gtc	acc gag gtc gtc	aaa cga gaa gcg	528
Lys Pro Gly Gly	Ile Leu Gly Val	Thr Glu Val Val	Lys Arg Glu Ala	
	165	170	175	
ggc ggc ggg atg	ccg gtg tcc ggg	gac agg tgg ccg	acc ggc ctt cgg	576
Gly Gly Gly Met	Pro Val Ser Gly	Asp Arg Trp Pro	Thr Gly Leu Arg	
	180	185	190	
atc tgc ctg gct	gag caa ctt ctg	gaa tcg ctg cgt	gca gcg ggg ttc	624
Ile Cys Leu Ala	Glu Gln Leu Leu	Glu Ser Leu Arg	Ala Ala Gly Phe	
	195	200	205	
gag atc ctc gat	tgg gag gac gtg	tcg tcg agg acc	cgg tac ttc atg	672
Glu Ile Leu Asp	Trp Glu Asp Val	Ser Ser Arg Thr	Arg Tyr Phe Met	
	210	215	220	
ccg cag ttc gcc	gaa gag ctc gct	gcg cac cag cac	ggg atc gcg gac	720
Pro Gln Phe Ala	Glu Glu Leu Ala	Ala His Gln His	Gly Ile Ala Asp	
	225	230	235	240
agg tac ggg ccg	gct gtc gcc ggc	tgg gcc gcc gcg	gtc tgc gat tat	768
Arg Tyr Gly Pro	Ala Val Ala Gly	Trp Ala Ala Ala	Val Cys Asp Tyr	
	245	250	255	
gag aaa tat gcc	cac gac atg ggc	tat gcg att ctg	acg gcg cgg aag	816
Glu Lys Tyr Ala	His Asp Met Gly	Tyr Ala Ile Leu	Thr Ala Arg Lys	
	260	265	270	
ccg gtc ggc tga				828
Pro Val Gly				
	275			

<210> 8

<211> 275

<210> 9
 <211> 1173
 <212> DNA
 <213> Saccharopolyspora spinosa

<220>
 <221> CDS
 <222> (1)..(1170)
 <223> ORF2; glycosyltransferase

<400> 9
 atg cgc gta ctc gtc gtt ccc ttg ccc tat ccg acg cat ctc atg gca 48
 Met Arg Val Leu Val Val Pro Leu Pro Tyr Pro Thr His Leu Met Ala
 1 5 10 15
 atg gtg ccg ctg tgc tgg gcg ctg caa gca tcc ggg cac gag gtc ctg 96
 Met Val Pro Leu Cys Trp Ala Leu Gln Ala Ser Gly His Glu Val Leu
 20 25 30
 atc gcc gca cca cca gag ctg cag gcg acc gcg cat ggt gca ggt ctc 144
 Ile Ala Ala Pro Pro Glu Leu Gln Ala Thr Ala His Gly Ala Gly Leu
 35 40 45
 acc acg gcc ggg atc cgc ggg aac gac agg acc ggc gat acg ggt gga 192
 Thr Thr Ala Gly Ile Arg Gly Asn Asp Arg Thr Gly Asp Thr Gly Gly
 50 55 60
 acc acg cag ctg cgc ttt ccc aat ccg gcg ttc ggt cag cgc gac acc 240
 Thr Thr Gln Leu Arg Phe Pro Asn Pro Ala Phe Gly Gln Arg Asp Thr
 65 70 75 80
 gag gca ggc cgg caa ctg tgg gag cag acc gcg tcc aat gtc gcg caa 288
 Glu Ala Gly Arg Gln Leu Trp Glu Gln Thr Ala Ser Asn Val Ala Gln
 85 90 95
 agc tcg ctc gat cag ctc ccc gaa tac ctt cga ctg gcc gag gcc tgg 336
 Ser Ser Leu Asp Gln Leu Pro Glu Tyr Leu Arg Leu Ala Glu Ala Trp
 100 105 110
 cga ccg tca gtg ctg ttg gtc gac gtc tgc gcg ctg atc ggc cgg gtg 384
 Arg Pro Ser Val Leu Leu Val Asp Val Cys Ala Leu Ile Gly Arg Val
 115 120 125
 ctc ggc gga ttg ctc gac ctg ccg gtc gtg ctg cac cgc tgg gga gtc 432
 Leu Gly Gly Leu Leu Asp Leu Pro Val Val Leu His Arg Trp Gly Val
 130 135 140
 gac ccc acc gca ggc ccc ttc agc gat cga gcc cac gag ttg ctt gac 480
 Asp Pro Thr Ala Gly Pro Phe Ser Asp Arg Ala His Glu Leu Leu Asp
 145 150 155 160
 ccg gtg tgc cgg cac cac gga ctg acc ggc ctg ccc act ccc gag ctc 528
 Pro Val Cys Arg His His Gly Leu Thr Gly Leu Pro Thr Pro Glu Leu
 165 170 175

atc ctc gat ccc tgt ccg ccg agc ctg caa gca agc gac gcg ccg caa	576
Ile Leu Asp Pro Cys Pro Pro Ser Leu Gln Ala Ser Asp Ala Pro Gln	
180 185 190	
ggc gca ccg gtc cag tac gtg ccg tac aac gga agc ggc gca ttc ccg	624
Gly Ala Pro Val Gln Tyr Val Pro Tyr Asn Gly Ser Gly Ala Phe Pro	
195 200 205	
gca tgg ggc gcg gcg cgc acc tca gca cgg cgg gtc tgc atc tgc atg	672
Ala Trp Gly Ala Ala Arg Thr Ser Ala Arg Arg Val Cys Ile Cys Met	
210 215 220	
ggc cgc atg gtg ctg aac gcc acc ggg ccg gct ccg ctg ctg cgc gca	720
Gly Arg Met Val Leu Asn Ala Thr Gly Pro Ala Pro Leu Leu Arg Ala	
225 230 235 240	
gta gcg gct gcc acc gag ttg ccc ggc gtc gag gcc gtg atc gcc gtt	768
Val Ala Ala Ala Thr Glu Leu Pro Gly Val Glu Ala Val Ile Ala Val	
245 250 255	
ccc ccc gag cac cgg gca ctt ctc acc gac cta ccc gac aac gcc cgg	816
Pro Pro Glu His Arg Ala Leu Leu Thr Asp Leu Pro Asp Asn Ala Arg	
260 265 270	
atc gcc gaa tcg gtc ccg ctc aac ctg ttc ctg cgt acc tgc gag ctg	864
Ile Ala Glu Ser Val Pro Leu Asn Leu Phe Leu Arg Thr Cys Glu Leu	
275 280 285	
gtc atc tgc gcg ggc ggc tcg gga acg gca ttc acc gcg acc cga ctc	912
Val Ile Cys Ala Gly Gly Ser Gly Thr Ala Phe Thr Ala Thr Arg Leu	
290 295 300	
ggc atc ccg caa ctc gtg ctt ccc cag tac ttc gac cag ttc gac tac	960
Gly Ile Pro Gln Leu Val Leu Pro Gln Tyr Phe Asp Gln Phe Asp Tyr	
305 310 315 320	
gcg cgc aac ctc gcc gct gcc ggg gcg ggc atc tgc ttg ccg gat gag	1008
Ala Arg Asn Leu Ala Ala Ala Gly Ala Gly Ile Cys Leu Pro Asp Glu	
325 330 335	
cag gcc cag tcc gac cac gaa cag ttc acc gac tca atc gca acg gtg	1056
Gln Ala Gln Ser Asp His Glu Gln Phe Thr Asp Ser Ile Ala Thr Val	
340 345 350	
ctc ggc gac acc ggc ttc gct gct gcg gca atc aaa ctc agc gac gag	1104
Leu Gly Asp Thr Gly Phe Ala Ala Ala Ala Ile Lys Leu Ser Asp Glu	
355 360 365	
atc acg gcc atg ccc cat ccc gcc gcg ctg gtg cgg acg ctg gag aac	1152
Ile Thr Ala Met Pro His Pro Ala Ala Leu Val Arg Thr Leu Glu Asn	
370 375 380	
act gcg gcc atc cgt gcc tga	1173
Thr Ala Ala Ile Arg Ala	
385 390	

<210> 10
<211> 390
<212> PRT
<213> Saccharopolyspora spinosa

<400> 10

Met	Arg	Val	Leu	Val	Val	Pro	Leu	Pro	Tyr	Pro	Thr	His	Leu	Met	Ala	
1				5					10					15		
Met	Val	Pro	Leu	Cys	Trp	Ala	Leu	Gln	Ala	Ser	Gly	His	Glu	Val	Leu	
			20					25					30			
Ile	Ala	Ala	Pro	Pro	Glu	Leu	Gln	Ala	Thr	Ala	His	Gly	Ala	Gly	Leu	
			35				40					45				
Thr	Thr	Ala	Gly	Ile	Arg	Gly	Asn	Asp	Arg	Thr	Gly	Asp	Thr	Gly	Gly	
			50				55				60					
Thr	Thr	Gln	Leu	Arg	Phe	Pro	Asn	Pro	Ala	Phe	Gly	Gln	Arg	Asp	Thr	
			65		70					75					80	
Glu	Ala	Gly	Arg	Gln	Leu	Trp	Glu	Gln	Thr	Ala	Ser	Asn	Val	Ala	Gln	
				85					90						95	
Ser	Ser	Leu	Asp	Gln	Leu	Pro	Glu	Tyr	Leu	Arg	Leu	Ala	Glu	Ala	Trp	
			100					105					110			
Arg	Pro	Ser	Val	Leu	Leu	Val	Asp	Val	Cys	Ala	Leu	Ile	Gly	Arg	Val	
			115				120						125			
Leu	Gly	Gly	Leu	Leu	Asp	Leu	Pro	Val	Val	Leu	His	Arg	Trp	Gly	Val	
			130				135					140				
Asp	Pro	Thr	Ala	Gly	Pro	Phe	Ser	Asp	Arg	Ala	His	Glu	Leu	Leu	Asp	
			145			150				155					160	
Pro	Val	Cys	Arg	His	His	Gly	Leu	Thr	Gly	Leu	Pro	Thr	Pro	Glu	Leu	
				165					170					175		
Ile	Leu	Asp	Pro	Cys	Pro	Pro	Ser	Leu	Gln	Ala	Ser	Asp	Ala	Pro	Gln	
			180					185					190			
Gly	Ala	Pro	Val	Gln	Tyr	Val	Pro	Tyr	Asn	Gly	Ser	Gly	Ala	Phe	Pro	
			195				200					205				
Ala	Trp	Gly	Ala	Ala	Arg	Thr	Ser	Ala	Arg	Arg	Val	Cys	Ile	Cys	Met	
			210			215					220					
Gly	Arg	Met	Val	Leu	Asn	Ala	Thr	Gly	Pro	Ala	Pro	Leu	Leu	Arg	Ala	
			225			230				235					240	
Val	Ala	Ala	Ala	Thr	Glu	Leu	Pro	Gly	Val	Glu	Ala	Val	Ile	Ala	Val	
				245					250					255		
Pro	Pro	Glu	His	Arg	Ala	Leu	Leu	Thr	Asp	Leu	Pro	Asp	Asn	Ala	Arg	
			260					265					270			

Ile Ala Glu Ser Val Pro Leu Asn Leu Phe Leu Arg Thr Cys Glu Leu
 275 280 285
 Val Ile Cys Ala Gly Gly Ser Gly Thr Ala Phe Thr Ala Thr Arg Leu
 290 295 300
 Gly Ile Pro Gln Leu Val Leu Pro Gln Tyr Phe Asp Gln Phe Asp Tyr
 305 310 315 320
 Ala Arg Asn Leu Ala Ala Ala Gly Ala Gly Ile Cys Leu Pro Asp Glu
 325 330 335
 Gln Ala Gln Ser Asp His Glu Gln Phe Thr Asp Ser Ile Ala Thr Val
 340 345 350
 Leu Gly Asp Thr Gly Phe Ala Ala Ala Ala Ile Lys Leu Ser Asp Glu
 355 360 365
 Ile Thr Ala Met Pro His Pro Ala Ala Leu Val Arg Thr Leu Glu Asn
 370 375 380
 Thr Ala Ala Ile Arg Ala
 385 390

<210> 11
 <211> 753
 <212> DNA
 <213> Saccharopolyspora spinosa

<220>
 <221> CDS
 <222> (1)..(750)
 <223> ORF3; O-methyltransferase

<400> 11
 atg ccc tcc cag aac gcg ctg tac ctg gac ctg ctc aag aag gta ctc 48
 Met Pro Ser Gln Asn Ala Leu Tyr Leu Asp Leu Leu Lys Lys Val Leu
 1 5 10 15
 acc aac acg att tac agt gat cgg ccg cat ccg aac gcc tgg cag gac 96
 Thr Asn Thr Ile Tyr Ser Asp Arg Pro His Pro Asn Ala Trp Gln Asp
 20 25 30
 aac acc gac tac agg cag gcc gct cgg gcc aaa ggc acg gac tgg cca 144
 Asn Thr Asp Tyr Arg Gln Ala Ala Arg Ala Lys Gly Thr Asp Trp Pro
 35 40 45
 act gtc gcg cac acg atg atc ggt ctg gag cgg ctg gac aac ctc cag 192
 Thr Val Ala His Thr Met Ile Gly Leu Glu Arg Leu Asp Asn Leu Gln
 50 55 60
 cac tgc gtg gaa gcc gtg ctc gca gac ggt gtt ccc ggg gat ttc gcc 240
 His Cys Val Glu Ala Val Leu Ala Asp Gly Val Pro Gly Asp Phe Ala
 65 70 75 80

gag acc ggt gtc tgg cgg ggc ggc gca tgc atc ttc atg cgc gcg gtt	288
Glu Thr Gly Val Trp Arg Gly Gly Ala Cys Ile Phe Met Arg Ala Val	
85 90 95	
ctc cag gca ttc gga gat acc gga cgt acc gtc tgg gta gtg gat tcc	336
Leu Gln Ala Phe Gly Asp Thr Gly Arg Thr Val Trp Val Val Asp Ser	
100 105 110	
ttc cag gga atg ccg gaa agc tct gcg caa gac cac caa gcg gac cag	384
Phe Gln Gly Met Pro Glu Ser Ser Ala Gln Asp His Gln Ala Asp Gln	
115 120 125	
gct atg gcg ctg cac gag tac aac gac gtg ctt ggc gta tcg ctt gag	432
Ala Met Ala Leu His Glu Tyr Asn Asp Val Leu Gly Val Ser Leu Glu	
130 135 140	
acc gtc cgg cag aac ttc gcc cgc tac ggg ctg ctc gac gaa cag gtc	480
Thr Val Arg Gln Asn Phe Ala Arg Tyr Gly Leu Leu Asp Glu Gln Val	
145 150 155 160	
agg ttc ctc ccc ggc tgg ttc cgg gac acc ttg ccc acc gcc ccc atc	528
Arg Phe Leu Pro Gly Trp Phe Arg Asp Thr Leu Pro Thr Ala Pro Ile	
165 170 175	
cag gaa ctc gcc gtg cta cga ctc gac ggc gac ctc tac gaa tcc aca	576
Gln Glu Leu Ala Val Leu Arg Leu Asp Gly Asp Leu Tyr Glu Ser Thr	
180 185 190	
atg gac tca ttg cgg aac ctg tac ccg aag ctc tcg ccg ggc gga ttc	624
Met Asp Ser Leu Arg Asn Leu Tyr Pro Lys Leu Ser Pro Gly Gly Phe	
195 200 205	
gtc atc atc gac gac tat ttt ctg ccg tcc tgc cag gac gcg gtg aag	672
Val Ile Ile Asp Asp Tyr Phe Leu Pro Ser Cys Gln Asp Ala Val Lys	
210 215 220	
ggg ttc cgc gcg gaa ctc ggg atc acg gaa ccc atc cac gac atc gac	720
Gly Phe Arg Ala Glu Leu Gly Ile Thr Glu Pro Ile His Asp Ile Asp	
225 230 235 240	
ggc acg ggc gcc tac tgg cgc cgc agc tgg tga	753
Gly Thr Gly Ala Tyr Trp Arg Arg Ser Trp	
245 250	

<210> 12

<211> 250

<212> PRT

<213> Saccharopolyspora spinosa

<400> 12

Met Pro Ser Gln Asn Ala Leu Tyr Leu Asp Leu Leu Lys Lys Val Leu
1 5 10 15

Thr Asn Thr Ile Tyr Ser Asp Arg Pro His Pro Asn Ala Trp Gln Asp
20 25 30

Asn Thr Asp Tyr Arg Gln Ala Ala Arg Ala Lys Gly Thr Asp Trp Pro
 35 40 45
 Thr Val Ala His Thr Met Ile Gly Leu Glu Arg Leu Asp Asn Leu Gln
 50 55 60
 His Cys Val Glu Ala Val Leu Ala Asp Gly Val Pro Gly Asp Phe Ala
 65 70 75 80
 Glu Thr Gly Val Trp Arg Gly Gly Ala Cys Ile Phe Met Arg Ala Val
 85 90 95
 Leu Gln Ala Phe Gly Asp Thr Gly Arg Thr Val Trp Val Val Asp Ser
 100 105 110
 Phe Gln Gly Met Pro Glu Ser Ser Ala Gln Asp His Gln Ala Asp Gln
 115 120 125
 Ala Met Ala Leu His Glu Tyr Asn Asp Val Leu Gly Val Ser Leu Glu
 130 135 140
 Thr Val Arg Gln Asn Phe Ala Arg Tyr Gly Leu Leu Asp Glu Gln Val
 145 150 155 160
 Arg Phe Leu Pro Gly Trp Phe Arg Asp Thr Leu Pro Thr Ala Pro Ile
 165 170 175
 Gln Glu Leu Ala Val Leu Arg Leu Asp Gly Asp Leu Tyr Glu Ser Thr
 180 185 190
 Met Asp Ser Leu Arg Asn Leu Tyr Pro Lys Leu Ser Pro Gly Gly Phe
 195 200 205
 Val Ile Ile Asp Asp Tyr Phe Leu Pro Ser Cys Gln Asp Ala Val Lys
 210 215 220
 Gly Phe Arg Ala Glu Leu Gly Ile Thr Glu Pro Ile His Asp Ile Asp
 225 230 235 240
 Gly Thr Gly Ala Tyr Trp Arg Arg Ser Trp
 245 250

<210> 13
 <211> 1188
 <212> DNA
 <213> Saccharopolyspora spinosa

<220>
 <221> CDS
 <222> (1)..(1185)
 <223> ORF4; O-methyltransferase

<400> 13
 atg agt gag atc gca gtt gcc ccc tgg tcg gtg gtg gag cgt ttg ctg 48

Met	Ser	Glu	Ile	Ala	Val	Ala	Pro	Trp	Ser	Val	Val	Glu	Arg	Leu	Leu	
1				5					10					15		
ctc	gcg	gcg	ggc	gcg	ggc	ccg	gcg	aag	ctc	cag	gaa	gca	gtg	cag	gtg	96
Leu	Ala	Ala	Gly	Ala	Gly	Pro	Ala	Lys	Leu	Gln	Glu	Ala	Val	Gln	Val	
			20					25					30			
gcc	gga	ctg	gac	gcg	gtg	gcc	gac	gcc	atc	gtc	gac	gaa	ctc	gtc	gta	144
Ala	Gly	Leu	Asp	Ala	Val	Ala	Asp	Ala	Ile	Val	Asp	Glu	Leu	Val	Val	
		35					40					45				
cgc	tgc	gat	ccg	ctg	tcg	ttg	gac	gag	tcg	gtg	cga	atc	ggc	ctg	gag	192
Arg	Cys	Asp	Pro	Leu	Ser	Leu	Asp	Glu	Ser	Val	Arg	Ile	Gly	Leu	Glu	
	50					55					60					
atc	act	tct	ggc	gct	cag	ctg	gtc	cgg	aga	acc	gtt	gag	ctc	gat	cac	240
Ile	Thr	Ser	Gly	Ala	Gln	Leu	Val	Arg	Arg	Thr	Val	Glu	Leu	Asp	His	
65					70				75					80		
gca	ggc	ctg	cgg	ctc	gcg	gcg	gtc	gcc	gaa	gca	gct	gct	gtt	ctc	cgg	288
Ala	Gly	Leu	Arg	Leu	Ala	Ala	Val	Ala	Glu	Ala	Ala	Ala	Val	Leu	Arg	
				85				90						95		
ttc	gac	gcg	gtg	gat	ctg	ctg	gaa	ggg	ctc	ttc	ggc	ccg	gtt	gac	ggc	336
Phe	Asp	Ala	Val	Asp	Leu	Leu	Glu	Gly	Leu	Phe	Gly	Pro	Val	Asp	Gly	
			100					105					110			
agg	cgg	cac	aac	agc	cgt	gaa	gtc	cgc	tgg	tcg	gac	agc	atg	acg	cag	384
Arg	Arg	His	Asn	Ser	Arg	Glu	Val	Arg	Trp	Ser	Asp	Ser	Met	Thr	Gln	
		115					120					125				
ttc	tcg	ccc	gac	cag	ggc	ctc	gcc	ggc	gcg	cag	cgc	ctg	ctg	gcg	ttc	432
Phe	Ser	Pro	Asp	Gln	Gly	Leu	Ala	Gly	Ala	Gln	Arg	Leu	Leu	Ala	Phe	
	130					135					140					
cgg	aac	agg	gtg	tcc	acc	gcg	gtg	cac	gcc	gtg	ctg	gcc	gca	gcc	gcc	480
Arg	Asn	Arg	Val	Ser	Thr	Ala	Val	His	Ala	Val	Leu	Ala	Ala	Ala	Ala	
145					150					155				160		
acc	agg	cgc	gcg	gac	ctc	ggc	gcg	ctg	gca	gtc	cgc	tac	gga	tcc	gac	528
Thr	Arg	Arg	Ala	Asp	Leu	Gly	Ala	Leu	Ala	Val	Arg	Tyr	Gly	Ser	Asp	
				165				170						175		
aaa	tgg	gcg	gac	ctg	cac	tgg	tac	acc	gaa	cac	tac	gag	cac	cac	ttc	576
Lys	Trp	Ala	Asp	Leu	His	Trp	Tyr	Thr	Glu	His	Tyr	Glu	His	His	Phe	
			180					185					190			
tcc	cga	ttc	cag	gat	gcc	ccg	gtg	cga	gtg	ttg	gaa	ata	gga	atc	ggc	624
Ser	Arg	Phe	Gln	Asp	Ala	Pro	Val	Arg	Val	Leu	Glu	Ile	Gly	Ile	Gly	
		195					200					205				
ggc	tat	cac	gca	ccc	gaa	ctc	ggc	ggc	gct	tcg	ctg	cgc	atg	tgg	cag	672
Gly	Tyr	His	Ala	Pro	Glu	Leu	Gly	Gly	Ala	Ser	Leu	Arg	Met	Trp	Gln	
	210					215					220					
cgg	tac	ttc	cgg	cga	ggc	ctc	gtt	tac	ggg	ctg	gac	att	ttc	gag	aaa	720
Arg	Tyr	Phe	Arg	Arg	Gly	Leu	Val	Tyr	Gly	Leu	Asp	Ile	Phe	Glu	Lys	

225	230	235	240	
gcc ggg aac gaa ggg cac cga gtg cga aag ctg cga ggt gac cag agc				768
Ala Gly Asn Glu Gly	His Arg Val Arg	Lys Leu Arg Gly	Asp Gln Ser	
	245	250	255	
gat gcg gaa ttc ctg gaa gac atg gcg ggg aag atc ggg ccg ttc gac				816
Asp Ala Glu Phe Leu Glu Asp Met Ala Gly Lys Ile Gly Pro Phe Asp				
	260	265	270	
att gtc atc gac gac ggc agc cat gtc aac gac cac gtc aag aaa tcc				864
Ile Val Ile Asp Asp Gly Ser His Val Asn Asp His Val Lys Lys Ser				
	275	280	285	
ttc caa tcc ctg ttt ccg cac gtc cgc cca ggt ggt ttg tac gtc atc				912
Phe Gln Ser Leu Phe Pro His Val Arg Pro Gly Gly Leu Tyr Val Ile				
	290	295	300	
gag gat ctc cag acg gcg tac tgg ccc ggc tac ggc ggt cgc gat ggg				960
Glu Asp Leu Gln Thr Ala Tyr Trp Pro Gly Tyr Gly Gly Arg Asp Gly				
	305	310	315	320
gaa ccc gcg gcc cag cgc acc tcg atc gac atg ctc aaa gaa ctg atc				1008
Glu Pro Ala Ala Gln Arg Thr Ser Ile Asp Met Leu Lys Glu Leu Ile				
	325	330	335	
gac ggc ctg cat tat cag gag cgc gaa tcg cgg tgc ggg acc gag ccc				1056
Asp Gly Leu His Tyr Gln Glu Arg Glu Ser Arg Cys Gly Thr Glu Pro				
	340	345	350	
tcc tac acg gaa cgg aac gtg gcg gcc ctg cac ttc tac cac aac ctg				1104
Ser Tyr Thr Glu Arg Asn Val Ala Ala Leu His Phe Tyr His Asn Leu				
	355	360	365	
gta ttc gtg gag aaa ggg ctc aac gct gag cct gcc gcg ccg ggg ttc				1152
Val Phe Val Glu Lys Gly Leu Asn Ala Glu Pro Ala Ala Pro Gly Phe				
	370	375	380	
gtg ccc cgg caa gcg ctc ggc gtc gag gac ggc tga				1188
Val Pro Arg Gln Ala Leu Gly Val Glu Asp Gly				
	385	390	395	

<210> 14

<211> 395

<212> PRT

<213> Saccharopolyspora spinosa

<400> 14

Met	Ser	Glu	Ile	Ala	Val	Ala	Pro	Trp	Ser	Val	Val	Glu	Arg	Leu	Leu
1				5				10						15	

Leu	Ala	Ala	Gly	Ala	Gly	Pro	Ala	Lys	Leu	Gln	Glu	Ala	Val	Gln	Val
			20					25					30		

Ala	Gly	Leu	Asp	Ala	Val	Ala	Asp	Ala	Ile	Val	Asp	Glu	Leu	Val	Val
		35					40					45			

Arg 50	Cys	Asp	Pro	Leu	Ser	Leu 55	Asp	Glu	Ser	Val	Arg 60	Ile	Gly	Leu	Glu
Ile 65	Thr	Ser	Gly	Ala	Gln 70	Leu	Val	Arg	Arg	Thr 75	Val	Glu	Leu	Asp	His 80
Ala	Gly	Leu	Arg	Leu 85	Ala	Ala	Val	Ala	Glu 90	Ala	Ala	Ala	Val	Leu 95	Arg
Phe	Asp	Ala	Val 100	Asp	Leu	Leu	Glu	Gly 105	Leu	Phe	Gly	Pro	Val 110	Asp	Gly
Arg	Arg	His 115	Asn	Ser	Arg	Glu	Val 120	Arg	Trp	Ser	Asp	Ser 125	Met	Thr	Gln
Phe 130	Ser	Pro	Asp	Gln	Gly	Leu 135	Ala	Gly	Ala	Gln	Arg 140	Leu	Leu	Ala	Phe
Arg 145	Asn	Arg	Val	Ser	Thr 150	Ala	Val	His	Ala	Val 155	Leu	Ala	Ala	Ala	Ala 160
Thr	Arg	Arg	Ala	Asp 165	Leu	Gly	Ala	Leu	Ala 170	Val	Arg	Tyr	Gly	Ser 175	Asp
Lys	Trp	Ala	Asp 180	Leu	His	Trp	Tyr	Thr 185	Glu	His	Tyr	Glu	His 190	His	Phe
Ser	Arg	Phe 195	Gln	Asp	Ala	Pro	Val 200	Arg	Val	Leu	Glu	Ile 205	Gly	Ile	Gly
Gly 210	Tyr	His	Ala	Pro	Glu	Leu 215	Gly	Gly	Ala	Ser	Leu 220	Arg	Met	Trp	Gln
Arg 225	Tyr	Phe	Arg	Arg	Gly 230	Leu	Val	Tyr	Gly	Leu 235	Asp	Ile	Phe	Glu	Lys 240
Ala	Gly	Asn	Glu	Gly 245	His	Arg	Val	Arg	Lys 250	Leu	Arg	Gly	Asp	Gln 255	Ser
Asp	Ala	Glu	Phe 260	Leu	Glu	Asp	Met	Ala 265	Gly	Lys	Ile	Gly	Pro 270	Phe	Asp
Ile	Val	Ile 275	Asp	Asp	Gly	Ser	His 280	Val	Asn	Asp	His 285	Val	Lys	Lys	Ser
Phe 290	Gln	Ser	Leu	Phe	Pro	His 295	Val	Arg	Pro	Gly	Gly 300	Leu	Tyr	Val	Ile
Glu 305	Asp	Leu	Gln	Thr	Ala 310	Tyr	Trp	Pro	Gly	Tyr 315	Gly	Gly	Arg	Asp	Gly 320
Glu	Pro	Ala	Ala	Gln 325	Arg	Thr	Ser	Ile	Asp 330	Met	Leu	Lys	Glu	Leu 335	Ile
Asp	Gly	Leu	His 340	Tyr	Gln	Glu	Arg	Glu 345	Ser	Arg	Cys	Gly	Thr 350	Glu	Pro

Ser Tyr Thr Glu Arg Asn Val Ala Ala Leu His Phe Tyr His Asn Leu
355 360 365

Val Phe Val Glu Lys Gly Leu Asn Ala Glu Pro Ala Ala Pro Gly Phe
370 375 380

Val Pro Arg Gln Ala Leu Gly Val Glu Asp Gly
385 390 395

<210> 15
<211> 1620
<212> DNA
<213> Saccharopolyspora spinosa

<220>
<221> CDS
<222> (1)..(1617)
<223> ORF5; C-C linking enzyme, cyclization enzyme

<400> 15
atg atc tcg gct gcg ggc gaa caa agt gga cca gtc aga aaa gga ggg 48
Met Ile Ser Ala Ala Gly Glu Gln Ser Gly Pro Val Arg Lys Gly Gly
1 5 10 15

gcg gtg ccc gaa ttc cat gac ccg gca ccc atg aat cgt cga acc cca 96
Ala Val Pro Glu Phe His Asp Pro Ala Pro Met Asn Arg Arg Thr Pro
20 25 30

gga aca gag atc acc gtc gag ccc gac gat cct cgt tat ccg gac ctc 144
Gly Thr Glu Ile Thr Val Glu Pro Asp Asp Pro Arg Tyr Pro Asp Leu
35 40 45

gtc gtc ggg cac aac ccc cgt ttc acc gga aaa ccc gaa cgc atc cac 192
Val Val Gly His Asn Pro Arg Phe Thr Gly Lys Pro Glu Arg Ile His
50 55 60

atc gcc agc tcc gcc gaa gac gtc gtg cac gcc gtc gcc gac gcc gtg 240
Ile Ala Ser Ser Ala Glu Asp Val Val His Ala Val Ala Asp Ala Val
65 70 75 80

cgc acc ggc agg cgg gta ggg gtc cgc agc ggc ggg cac tgc ttc gag 288
Arg Thr Gly Arg Arg Val Gly Val Arg Ser Gly Gly His Cys Phe Glu
85 90 95

aat ctc gtt gcg gac ccg gcg atc cga gtg ctc gtc gac ctc tcc gag 336
Asn Leu Val Ala Asp Pro Ala Ile Arg Val Leu Val Asp Leu Ser Glu
100 105 110

ctc aac cgc gtg tac tac gac agc acg cgc ggg gca ttc gcg atc gag 384
Leu Asn Arg Val Tyr Tyr Asp Ser Thr Arg Gly Ala Phe Ala Ile Glu
115 120 125

gcg ggc gcc gcc ctc ggg cag gtg tac cga acc ctg ttc aag aac tgg 432
Ala Gly Ala Ala Leu Gly Gln Val Tyr Arg Thr Leu Phe Lys Asn Trp

130	135	140	
ggc gtg acg atc ccg acc ggc gca tgt ccc ggg gtg ggc gca ggc ggg Gly Val Thr Ile Pro Thr Gly Ala Cys Pro Gly Val Gly Ala Gly Gly 145 150 155 160			480
cac atc ctc ggc ggg gga tac ggc ccg ctg tcg cgc cga ttc ggt tcg His Ile Leu Gly Gly Gly Tyr Gly Pro Leu Ser Arg Arg Phe Gly Ser 165 170 175			528
gtc gtc gac tac ctt caa ggc gtc gag gtc gtc gtg gtc gac cag gcc Val Val Asp Tyr Leu Gln Gly Val Glu Val Val Val Val Asp Gln Ala 180 185 190			576
ggt gaa gtg cac atc gtc gag gcc gac cgg aac tcc acg ggc gcc ggt Gly Glu Val His Ile Val Glu Ala Asp Arg Asn Ser Thr Gly Ala Gly 195 200 205			624
cac gac ttg tgg tgg gcg cac acc ggt ggc ggt ggc ggc aac ttc ggg His Asp Leu Trp Trp Ala His Thr Gly Gly Gly Gly Gly Asn Phe Gly 210 215 220			672
atc gtc acc agg ttt tgg ctc cga acg ccg gac gtg gtc agc acc gac Ile Val Thr Arg Phe Trp Leu Arg Thr Pro Asp Val Val Ser Thr Asp 225 230 235 240			720
gcc gca gag ctc ctg cca cgg ccg ccc gcg aca gtg ctg ctc cga tcg Ala Ala Glu Leu Leu Pro Arg Pro Pro Ala Thr Val Leu Leu Arg Ser 245 250 255			768
ttc cac tgg ccg tgg cac gaa ctg aca gag cag tca ttc gcc gtg ctc Phe His Trp Pro Trp His Glu Leu Thr Glu Gln Ser Phe Ala Val Leu 260 265 270			816
cta cag aac ttc ggc aat tgg tac gag cag cac agc gcg cct gaa tcc Leu Gln Asn Phe Gly Asn Trp Tyr Glu Gln His Ser Ala Pro Glu Ser 275 280 285			864
acg caa ctc ggg ttg ttc agc acg ctc gtc tgc gca cac cgg caa gct Thr Gln Leu Gly Leu Phe Ser Thr Leu Val Cys Ala His Arg Gln Ala 290 295 300			912
ggc tac gtc acg ctg aac gtt cac ctg gac ggc acg gat ccg aac gcg Gly Tyr Val Thr Leu Asn Val His Leu Asp Gly Thr Asp Pro Asn Ala 305 310 315 320			960
gaa cgc acc ctg gcc gaa cac ctg tcg gcg atc aac gcc cag gtc ggc Glu Arg Thr Leu Ala Glu His Leu Ser Ala Ile Asn Ala Gln Val Gly 325 330 335			1008
gtg act cca gcc gaa ggg ctg cgg gaa acc ctg ccg tgg ttg cga tcg Val Thr Pro Ala Glu Gly Leu Arg Glu Thr Leu Pro Trp Leu Arg Ser 340 345 350			1056
acc cag gtg gcc ggg gcg atc gcc gaa ggc ggc gaa ccg ggc atg caa Thr Gln Val Ala Gly Ala Ile Ala Glu Gly Gly Glu Pro Gly Met Gln 355 360 365			1104

cgg acc aag gtc aaa gcc gcc tac ttg cgc acc ggg ctg tcc gaa gct	1152
Arg Thr Lys Val Lys Ala Ala Tyr Leu Arg Thr Gly Leu Ser Glu Ala	
370 375 380	
caa cta gcc acg gtt tac cgg cgg ctg acc gtc tac gga tac gac aac	1200
Gln Leu Ala Thr Val Tyr Arg Arg Leu Thr Val Tyr Gly Tyr Asp Asn	
385 390 395 400	
cct gcg gcg gcg ctg ttg ctg ctc ggt tac ggc ggt atg gcg aat gcc	1248
Pro Ala Ala Ala Leu Leu Leu Leu Gly Tyr Gly Gly Met Ala Asn Ala	
405 410 415	
gtg gct ccg tcg gcc acc gca ctc gct cag cgc gac tcg gtt ctc aaa	1296
Val Ala Pro Ser Ala Thr Ala Leu Ala Gln Arg Asp Ser Val Leu Lys	
420 425 430	
gcg ctg ttc gtc acg aac tgg tcg gag ccc gcc gag gac gag cgg cat	1344
Ala Leu Phe Val Thr Asn Trp Ser Glu Pro Ala Glu Asp Glu Arg His	
435 440 445	
ctg acc tgg att cgc ggt ttc tac cgc gag atg tac gcc gaa acc ggc	1392
Leu Thr Trp Ile Arg Gly Phe Tyr Arg Glu Met Tyr Ala Glu Thr Gly	
450 455 460	
gga gtt ccg gtg cca ggt acc cgt gtc gac ggc tcc tac atc aac tac	1440
Gly Val Pro Val Pro Gly Thr Arg Val Asp Gly Ser Tyr Ile Asn Tyr	
465 470 475 480	
ccg gac acc gac ttg gcc gat cca ttg tgg aac acc tcc ggt gtt gcc	1488
Pro Asp Thr Asp Leu Ala Asp Pro Leu Trp Asn Thr Ser Gly Val Ala	
485 490 495	
tgg cac gac ctg tac tac aaa gac aac tac ccg cgg ctg cag cgg gcc	1536
Trp His Asp Leu Tyr Tyr Lys Asp Asn Tyr Pro Arg Leu Gln Arg Ala	
500 505 510	
aaa gcg cgg tgg gat ccg cag aac atc ttc cag cac ggc ctg tcg atc	1584
Lys Ala Arg Trp Asp Pro Gln Asn Ile Phe Gln His Gly Leu Ser Ile	
515 520 525	
aaa ccg ccg gca cgg ctt tca ccc ggt cag cca tga	1620
Lys Pro Pro Ala Arg Leu Ser Pro Gly Gln Pro	
530 535	

<210> 16

<211> 539

<212> PRT

<213> Saccharopolyspora spinosa

<400> 16

Met Ile Ser Ala Ala Gly Glu Gln Ser Gly Pro Val Arg Lys Gly Gly
1 5 10 15

Ala Val Pro Glu Phe His Asp Pro Ala Pro Met Asn Arg Arg Thr Pro
20 25 30

Gly	Thr	Glu	Ile	Thr	Val	Glu	Pro	Asp	Asp	Pro	Arg	Tyr	Pro	Asp	Leu	35	40	45
Val	Val	Gly	His	Asn	Pro	Arg	Phe	Thr	Gly	Lys	Pro	Glu	Arg	Ile	His	50	55	60
Ile	Ala	Ser	Ser	Ala	Glu	Asp	Val	Val	His	Ala	Val	Ala	Asp	Ala	Val	65	70	75
Arg	Thr	Gly	Arg	Arg	Val	Gly	Val	Arg	Ser	Gly	Gly	His	Cys	Phe	Glu	85	90	95
Asn	Leu	Val	Ala	Asp	Pro	Ala	Ile	Arg	Val	Leu	Val	Asp	Leu	Ser	Glu	100	105	110
Leu	Asn	Arg	Val	Tyr	Tyr	Asp	Ser	Thr	Arg	Gly	Ala	Phe	Ala	Ile	Glu	115	120	125
Ala	Gly	Ala	Ala	Leu	Gly	Gln	Val	Tyr	Arg	Thr	Leu	Phe	Lys	Asn	Trp	130	135	140
Gly	Val	Thr	Ile	Pro	Thr	Gly	Ala	Cys	Pro	Gly	Val	Gly	Ala	Gly	Gly	145	150	155
His	Ile	Leu	Gly	Gly	Gly	Tyr	Gly	Pro	Leu	Ser	Arg	Arg	Phe	Gly	Ser	165	170	175
Val	Val	Asp	Tyr	Leu	Gln	Gly	Val	Glu	Val	Val	Val	Val	Asp	Gln	Ala	180	185	190
Gly	Glu	Val	His	Ile	Val	Glu	Ala	Asp	Arg	Asn	Ser	Thr	Gly	Ala	Gly	195	200	205
His	Asp	Leu	Trp	Trp	Ala	His	Thr	Gly	Gly	Gly	Gly	Gly	Asn	Phe	Gly	210	215	220
Ile	Val	Thr	Arg	Phe	Trp	Leu	Arg	Thr	Pro	Asp	Val	Val	Ser	Thr	Asp	225	230	235
Ala	Ala	Glu	Leu	Leu	Pro	Arg	Pro	Pro	Ala	Thr	Val	Leu	Leu	Arg	Ser	245	250	255
Phe	His	Trp	Pro	Trp	His	Glu	Leu	Thr	Glu	Gln	Ser	Phe	Ala	Val	Leu	260	265	270
Leu	Gln	Asn	Phe	Gly	Asn	Trp	Tyr	Glu	Gln	His	Ser	Ala	Pro	Glu	Ser	275	280	285
Thr	Gln	Leu	Gly	Leu	Phe	Ser	Thr	Leu	Val	Cys	Ala	His	Arg	Gln	Ala	290	295	300
Gly	Tyr	Val	Thr	Leu	Asn	Val	His	Leu	Asp	Gly	Thr	Asp	Pro	Asn	Ala	305	310	315
Glu	Arg	Thr	Leu	Ala	Glu	His	Leu	Ser	Ala	Ile	Asn	Ala	Gln	Val	Gly	325	330	335

Val Thr Pro Ala Glu Gly Leu Arg Glu Thr Leu Pro Trp Leu Arg Ser
 340 345 350
 Thr Gln Val Ala Gly Ala Ile Ala Glu Gly Gly Glu Pro Gly Met Gln
 355 360 365
 Arg Thr Lys Val Lys Ala Ala Tyr Leu Arg Thr Gly Leu Ser Glu Ala
 370 375 380
 Gln Leu Ala Thr Val Tyr Arg Arg Leu Thr Val Tyr Gly Tyr Asp Asn
 385 390 395 400
 Pro Ala Ala Ala Leu Leu Leu Leu Gly Tyr Gly Gly Met Ala Asn Ala
 405 410 415
 Val Ala Pro Ser Ala Thr Ala Leu Ala Gln Arg Asp Ser Val Leu Lys
 420 425 430
 Ala Leu Phe Val Thr Asn Trp Ser Glu Pro Ala Glu Asp Glu Arg His
 435 440 445
 Leu Thr Trp Ile Arg Gly Phe Tyr Arg Glu Met Tyr Ala Glu Thr Gly
 450 455 460
 Gly Val Pro Val Pro Gly Thr Arg Val Asp Gly Ser Tyr Ile Asn Tyr
 465 470 475 480
 Pro Asp Thr Asp Leu Ala Asp Pro Leu Trp Asn Thr Ser Gly Val Ala
 485 490 495
 Trp His Asp Leu Tyr Tyr Lys Asp Asn Tyr Pro Arg Leu Gln Arg Ala
 500 505 510
 Lys Ala Arg Trp Asp Pro Gln Asn Ile Phe Gln His Gly Leu Ser Ile
 515 520 525
 Lys Pro Pro Ala Arg Leu Ser Pro Gly Gln Pro
 530 535

<210> 17
 <211> 1194
 <212> DNA
 <213> Saccharopolyspora spinosa

<220>
 <221> CDS
 <222> (1)..(1191)
 <223> ORF6; methyltransferase

<400> 17
 atg tcc aca acg cac gag atc gaa acc gtg gaa cgc atc atc ctc gcc 48
 Met Ser Thr Thr His Glu Ile Glu Thr Val Glu Arg Ile Ile Leu Ala
 1 5 10 15

gcc gga tcc agt gcg gcg agc ctg gcc gac ctg acc acc gaa ctc gga	96
Ala Gly Ser Ser Ala Ala Ser Leu Ala Asp Leu Thr Thr Glu Leu Gly	
20 25 30	
ctc gcc agg atc gca ccc gtg ctg atc gac gag atc ctc ttc cgc gcg	144
Leu Ala Arg Ile Ala Pro Val Leu Ile Asp Glu Ile Leu Phe Arg Ala	
35 40 45	
gaa ccg gcc ccc gac atc gaa cgg acc gag gtc gcg gtc cag atc acc	192
Glu Pro Ala Pro Asp Ile Glu Arg Thr Glu Val Ala Val Gln Ile Thr	
50 55 60	
cac cga ggc gag acc gtt gac ttc gtc ctg acg cta cag tcc ggt gag	240
His Arg Gly Glu Thr Val Asp Phe Val Leu Thr Leu Gln Ser Gly Glu	
65 70 75 80	
ctg atc aag gcc gag caa cga ccg gtc gga gac gtc ccg ctg cgg atc	288
Leu Ile Lys Ala Glu Gln Arg Pro Val Gly Asp Val Pro Leu Arg Ile	
85 90 95	
ggt tac gag ctc acc gat ctc atc gcc gag ttg ttc ggc cca gga gct	336
Gly Tyr Glu Leu Thr Asp Leu Ile Ala Glu Leu Phe Gly Pro Gly Ala	
100 105 110	
ccc agg gcc gtc ggc gcc cgg agc acc aac ttc ctc cga acc acc aca	384
Pro Arg Ala Val Gly Ala Arg Ser Thr Asn Phe Leu Arg Thr Thr Thr	
115 120 125	
tcc ggt tcg ata ccc ggt ccg tcg gaa ctg tcc gat ggc ttc cag gcc	432
Ser Gly Ser Ile Pro Gly Pro Ser Glu Leu Ser Asp Gly Phe Gln Ala	
130 135 140	
atc tcc gca gtg gtc gcc ggc tgc ggg cac cga cgt ccc gac ctc aac	480
Ile Ser Ala Val Val Ala Gly Cys Gly His Arg Arg Pro Asp Leu Asn	
145 150 155 160	
ttg ctc gcc tcc cac tac cgc acg gac aag tgg ggc ggc ctg cac tgg	528
Leu Leu Ala Ser His Tyr Arg Thr Asp Lys Trp Gly Gly Leu His Trp	
165 170 175	
ttc acc ccg cta tac gag cga cac ctc ggc gag ttc cgt gat cgc ccg	576
Phe Thr Pro Leu Tyr Glu Arg His Leu Gly Glu Phe Arg Asp Arg Pro	
180 185 190	
gtg cgc atc ctg gag atc ggt gtc ggt ggc tac aac ttc gac ggt ggc	624
Val Arg Ile Leu Glu Ile Gly Val Gly Gly Tyr Asn Phe Asp Gly Gly	
195 200 205	
ggc ggc gaa tcc ctg aag atg tgg aag cgc tac ttc cac cgc ggc ctc	672
Gly Gly Glu Ser Leu Lys Met Trp Lys Arg Tyr Phe His Arg Gly Leu	
210 215 220	
gtg ttc ggg atg gac gtt ttc gac aag tcc ttc ctc gac cag cag agg	720
Val Phe Gly Met Asp Val Phe Asp Lys Ser Phe Leu Asp Gln Gln Arg	
225 230 235 240	
ctc tgc acc gtc cgc gcc gac cag agc aag ccc gag gag ctg gcc gcc	768

Leu	Cys	Thr	Val	Arg	Ala	Asp	Gln	Ser	Lys	Pro	Glu	Glu	Leu	Ala	Ala		
				245					250					255			
gtt	gac	gac	aag	tac	gga	ccg	ttc	gac	atc	atc	atc	gac	gat	ggc	agc	816	
Val	Asp	Asp	Lys	Tyr	Gly	Pro	Phe	Asp	Ile	Ile	Ile	Asp	Asp	Gly	Ser		
			260					265					270				
cac	atc	aac	gga	cac	gtg	cgc	aca	tcc	ctg	gaa	acg	ctg	ttc	ccc	cgg	864	
His	Ile	Asn	Gly	His	Val	Arg	Thr	Ser	Leu	Glu	Thr	Leu	Phe	Pro	Arg		
		275					280					285					
ttg	cgc	agc	ggg	ggc	gta	tac	gtg	atc	gag	gat	ctg	tgg	acg	acc	tat	912	
Leu	Arg	Ser	Gly	Gly	Val	Tyr	Val	Ile	Glu	Asp	Leu	Trp	Thr	Thr	Tyr		
	290					295					300						
gct	ccc	gga	ttc	ggc	ggg	cag	gcg	cag	tgc	ccg	gcc	gca	ccc	ggc	acc	960	
Ala	Pro	Gly	Phe	Gly	Gly	Gln	Ala	Gln	Cys	Pro	Ala	Ala	Pro	Gly	Thr		
305					310				315					320			
acg	gtc	agc	ctg	ctc	aag	aac	ctg	ttg	gaa	ggc	gtt	cag	cac	gag	gag	1008	
Thr	Val	Ser	Leu	Leu	Lys	Asn	Leu	Leu	Glu	Gly	Val	Gln	His	Glu	Glu		
			325					330						335			
cag	ccg	cat	gcg	ggc	tcg	tac	gag	ccg	agc	tac	ctg	gaa	cgc	aat	ttg	1056	
Gln	Pro	His	Ala	Gly	Ser	Tyr	Glu	Pro	Ser	Tyr	Leu	Glu	Arg	Asn	Leu		
			340					345					350				
gtc	ggc	ctc	cac	acc	tac	cac	aac	atc	gcg	ttc	ctg	gag	aaa	ggc	gtc	1104	
Val	Gly	Leu	His	Thr	Tyr	His	Asn	Ile	Ala	Phe	Leu	Glu	Lys	Gly	Val		
		355					360					365					
aac	gcc	gaa	ggc	ggc	gtt	cct	gct	tgg	gtg	cca	agg	agt	ctg	gac	gac	1152	
Asn	Ala	Glu	Gly	Gly	Val	Pro	Ala	Trp	Val	Pro	Arg	Ser	Leu	Asp	Asp		
	370					375					380						
ata	ttg	cac	ctg	gcc	gac	gtg	aac	agc	gcg	gag	gac	gag	tga			1194	
Ile	Leu	His	Leu	Ala	Asp	Val	Asn	Ser	Ala	Glu	Asp	Glu					
385					390					395							

<210> 18
 <211> 397
 <212> PRT
 <213> Saccharopolyspora spinosa

<400> 18
 Met Ser Thr Thr His Glu Ile Glu Thr Val Glu Arg Ile Ile Leu Ala
 1 5 10 15
 Ala Gly Ser Ser Ala Ala Ser Leu Ala Asp Leu Thr Thr Glu Leu Gly
 20 25 30
 Leu Ala Arg Ile Ala Pro Val Leu Ile Asp Glu Ile Leu Phe Arg Ala
 35 40 45
 Glu Pro Ala Pro Asp Ile Glu Arg Thr Glu Val Ala Val Gln Ile Thr
 50 55 60

His	Arg	Gly	Glu	Thr	Val	Asp	Phe	Val	Leu	Thr	Leu	Gln	Ser	Gly	Glu	65	70	75	80
Leu	Ile	Lys	Ala	Glu	Gln	Arg	Pro	Val	Gly	Asp	Val	Pro	Leu	Arg	Ile	85	90	95	
Gly	Tyr	Glu	Leu	Thr	Asp	Leu	Ile	Ala	Glu	Leu	Phe	Gly	Pro	Gly	Ala	100	105	110	
Pro	Arg	Ala	Val	Gly	Ala	Arg	Ser	Thr	Asn	Phe	Leu	Arg	Thr	Thr	Thr	115	120	125	
Ser	Gly	Ser	Ile	Pro	Gly	Pro	Ser	Glu	Leu	Ser	Asp	Gly	Phe	Gln	Ala	130	135	140.	
Ile	Ser	Ala	Val	Val	Ala	Gly	Cys	Gly	His	Arg	Arg	Pro	Asp	Leu	Asn	145	150	155	160
Leu	Leu	Ala	Ser	His	Tyr	Arg	Thr	Asp	Lys	Trp	Gly	Gly	Leu	His	Trp	165	170	175	
Phe	Thr	Pro	Leu	Tyr	Glu	Arg	His	Leu	Gly	Glu	Phe	Arg	Asp	Arg	Pro	180	185	190	
Val	Arg	Ile	Leu	Glu	Ile	Gly	Val	Gly	Gly	Tyr	Asn	Phe	Asp	Gly	Gly	195	200	205	
Gly	Gly	Glu	Ser	Leu	Lys	Met	Trp	Lys	Arg	Tyr	Phe	His	Arg	Gly	Leu	210	215	220	
Val	Phe	Gly	Met	Asp	Val	Phe	Asp	Lys	Ser	Phe	Leu	Asp	Gln	Gln	Arg	225	230	235	240
Leu	Cys	Thr	Val	Arg	Ala	Asp	Gln	Ser	Lys	Pro	Glu	Glu	Leu	Ala	Ala	245	250	255	
Val	Asp	Asp	Lys	Tyr	Gly	Pro	Phe	Asp	Ile	Ile	Ile	Asp	Asp	Gly	Ser	260	265	270	
His	Ile	Asn	Gly	His	Val	Arg	Thr	Ser	Leu	Glu	Thr	Leu	Phe	Pro	Arg	275	280	285	
Leu	Arg	Ser	Gly	Gly	Val	Tyr	Val	Ile	Glu	Asp	Leu	Trp	Thr	Thr	Tyr	290	295	300	
Ala	Pro	Gly	Phe	Gly	Gly	Gln	Ala	Gln	Cys	Pro	Ala	Ala	Pro	Gly	Thr	305	310	315	320
Thr	Val	Ser	Leu	Leu	Lys	Asn	Leu	Leu	Glu	Gly	Val	Gln	His	Glu	Glu	325	330	335	
Gln	Pro	His	Ala	Gly	Ser	Tyr	Glu	Pro	Ser	Tyr	Leu	Glu	Arg	Asn	Leu	340	345	350	
Val	Gly	Leu	His	Thr	Tyr	His	Asn	Ile	Ala	Phe	Leu	Glu	Lys	Gly	Val	355	360	365	

Asn Ala Glu Gly Gly Val Pro Ala Trp Val Pro Arg Ser Leu Asp Asp
 370 375 380

Ile Leu His Leu Ala Asp Val Asn Ser Ala Glu Asp Glu
 385 390 395

<210> 19
 <211> 900
 <212> DNA
 <213> Saccharopolyspora spinosa

<220>
 <221> CDS
 <222> (1)..(897)
 <223> ORF7; O-methyltransferase

<400> 19
 gtg aac agc aga ggg gcg aac aca cag gca ttt ccg acc gcg gat cag 48
 Val Asn Ser Arg Gly Ala Asn Thr Gln Ala Phe Pro Thr Ala Asp Gln
 1 5 10 15
 gtg gag tcc atc ttc gat gcg ttg gcg cac ggg cgt ccc ctg cac cac 96
 Val Glu Ser Ile Phe Asp Ala Leu Ala His Gly Arg Pro Leu His His
 20 25 30
 ggt tac tgg gcg ggc ggg tat cgg gag gat gcc ggt gcc aca ccg tgg 144
 Gly Tyr Trp Ala Gly Gly Tyr Arg Glu Asp Ala Gly Ala Thr Pro Trp
 35 40 45
 tcg gat gct gcc gac caa ctg acc gac ctg ttc atc gac aag gcc gcg 192
 Ser Asp Ala Ala Asp Gln Leu Thr Asp Leu Phe Ile Asp Lys Ala Ala
 50 55 60
 ctc cgt ccc gga gcg cac ctg ttc gac ctg ggc tgc ggc aat ggg cag 240
 Leu Arg Pro Gly Ala His Leu Phe Asp Leu Gly Cys Gly Asn Gly Gln
 65 70 75 80
 ccc gta gtc cgt gcg gca tgc gcc agc ggc gtt cga gtc acc gga atc 288
 Pro Val Val Arg Ala Ala Cys Ala Ser Gly Val Arg Val Thr Gly Ile
 85 90 95
 acc gtg aac gcc cag cat ctc gcc gcc gcc acc agg ctc gcc aac gag 336
 Thr Val Asn Ala Gln His Leu Ala Ala Ala Thr Arg Leu Ala Asn Glu
 100 105 110
 acc gga ctg gcc ggc agt ctt gag ttc gat cta gtc gac ggc gcc cag 384
 Thr Gly Leu Ala Gly Ser Leu Glu Phe Asp Leu Val Asp Gly Ala Gln
 115 120 125
 ctg ccc tac ccg gac ggt ttc ttt cag gcc gca tgg gcg atg cag tcc 432
 Leu Pro Tyr Pro Asp Gly Phe Phe Gln Ala Ala Trp Ala Met Gln Ser
 130 135 140
 gtc gtg cag atc gtg gac cag gcc gcc gcg atc cgc gag gtc cac cga 480

Val	Val	Gln	Ile	Val	Asp	Gln	Ala	Ala	Ala	Ile	Arg	Glu	Val	His	Arg	
145					150					155					160	
atc	ctg	gaa	ccc	ggc	ggc	cgg	ttc	gtc	ctc	gga	gac	atc	atc	act	cgg	528
Ile	Leu	Glu	Pro	Gly	Gly	Arg	Phe	Val	Leu	Gly	Asp	Ile	Ile	Thr	Arg	
				165					170					175		
gtt	cga	ctc	ccg	gaa	gag	tac	gcg	gcg	gtt	tgg	acg	ggc	acg	acc	gcc	576
Val	Arg	Leu	Pro	Glu	Glu	Tyr	Ala	Ala	Val	Trp	Thr	Gly	Thr	Thr	Ala	
			180					185					190			
cat	acc	ttg	aac	agc	ttc	acg	gcg	ctg	gtc	agc	gaa	gcc	ggg	ttc	gag	624
His	Thr	Leu	Asn	Ser	Phe	Thr	Ala	Leu	Val	Ser	Glu	Ala	Gly	Phe	Glu	
		195					200				205					
att	ctc	gaa	gtc	acc	gac	ctc	acg	gca	cag	acc	agg	tgc	atg	gtc	tcc	672
Ile	Leu	Glu	Val	Thr	Asp	Leu	Thr	Ala	Gln	Thr	Arg	Cys	Met	Val	Ser	
	210					215					220					
tgg	tac	gtc	gac	gag	ttg	ctc	cgg	aaa	ctc	gat	gag	ctc	gcc	ggc	gtc	720
Trp	Tyr	Val	Asp	Glu	Leu	Leu	Arg	Lys	Leu	Asp	Glu	Leu	Ala	Gly	Val	
225				230						235				240		
gag	cct	gcg	gct	gtc	ggc	acc	tac	cag	caa	cgc	tac	ttg	gga	gac	atc	768
Glu	Pro	Ala	Ala	Val	Gly	Thr	Tyr	Gln	Gln	Arg	Tyr	Leu	Gly	Asp	Ile	
				245				250						255		
gcg	gcg	aag	cac	gga	ccg	gga	cca	gca	cag	ctg	atc	gcc	gcg	gtt	gcg	816
Ala	Ala	Lys	His	Gly	Pro	Gly	Pro	Ala	Gln	Leu	Ile	Ala	Ala	Val	Ala	
			260					265					270			
gaa	tac	cgg	aaa	cat	ccg	gat	tac	gcc	aga	aac	gag	gaa	agc	atg	ggc	864
Glu	Tyr	Arg	Lys	His	Pro	Asp	Tyr	Ala	Arg	Asn	Glu	Glu	Ser	Met	Gly	
		275					280				285					
ttc	atg	ctc	ctg	cag	gct	cga	aag	aag	cag	tcc	tga					900
Phe	Met	Leu	Leu	Gln	Ala	Arg	Lys	Lys	Gln	Ser						
	290					295										

<210> 20

<211> 299

<212> PRT

<213> Saccharopolyspora spinosa

<400> 20

Val	Asn	Ser	Arg	Gly	Ala	Asn	Thr	Gln	Ala	Phe	Pro	Thr	Ala	Asp	Gln	
1				5				10						15		
Val	Glu	Ser	Ile	Phe	Asp	Ala	Leu	Ala	His	Gly	Arg	Pro	Leu	His	His	
			20					25					30			
Gly	Tyr	Trp	Ala	Gly	Gly	Tyr	Arg	Glu	Asp	Ala	Gly	Ala	Thr	Pro	Trp	
		35					40					45				
Ser	Asp	Ala	Ala	Asp	Gln	Leu	Thr	Asp	Leu	Phe	Ile	Asp	Lys	Ala	Ala	
	50					55					60					

Leu Arg Pro Gly Ala His Leu Phe Asp Leu Gly Cys Gly Asn Gly Gln
 65 70 75 80
 Pro Val Val Arg Ala Ala Cys Ala Ser Gly Val Arg Val Thr Gly Ile
 85 90 95
 Thr Val Asn Ala Gln His Leu Ala Ala Ala Thr Arg Leu Ala Asn Glu
 100 105 110
 Thr Gly Leu Ala Gly Ser Leu Glu Phe Asp Leu Val Asp Gly Ala Gln
 115 120 125
 Leu Pro Tyr Pro Asp Gly Phe Phe Gln Ala Ala Trp Ala Met Gln Ser
 130 135 140
 Val Val Gln Ile Val Asp Gln Ala Ala Ala Ile Arg Glu Val His Arg
 145 150 155 160
 Ile Leu Glu Pro Gly Gly Arg Phe Val Leu Gly Asp Ile Ile Thr Arg
 165 170 175
 Val Arg Leu Pro Glu Glu Tyr Ala Ala Val Trp Thr Gly Thr Thr Ala
 180 185 190
 His Thr Leu Asn Ser Phe Thr Ala Leu Val Ser Glu Ala Gly Phe Glu
 195 200 205
 Ile Leu Glu Val Thr Asp Leu Thr Ala Gln Thr Arg Cys Met Val Ser
 210 215 220
 Trp Tyr Val Asp Glu Leu Leu Arg Lys Leu Asp Glu Leu Ala Gly Val
 225 230 235 240
 Glu Pro Ala Ala Val Gly Thr Tyr Gln Gln Arg Tyr Leu Gly Asp Ile
 245 250 255
 Ala Ala Lys His Gly Pro Gly Pro Ala Gln Leu Ile Ala Ala Val Ala
 260 265 270
 Glu Tyr Arg Lys His Pro Asp Tyr Ala Arg Asn Glu Glu Ser Met Gly
 275 280 285
 Phe Met Leu Leu Gln Ala Arg Lys Lys Gln Ser
 290 295

<210> 21
 <211> 1167
 <212> DNA
 <213> Saccharopolyspora spinosa

<220>
 <221> CDS
 <222> (1)..(1164)
 <223> ORF8; cyclization enzyme

<400> 21

atg gcc tcc gag cac gcc agc ctg gtc ggc gac gat ctg cgg gca ccc	48
Met Ala Ser Glu His Ala Ser Leu Val Gly Asp Asp Leu Arg Ala Pro	
1 5 10 15	
gcg gat gat ccc ttc tac cga ccg ccg acg ccg cta ccg ccg ggt gtc	96
Ala Asp Asp Pro Phe Tyr Arg Pro Pro Thr Pro Leu Pro Pro Gly Val	
20 25 30	
ccg ggc acg ctc ctc agg gcc ccg ccc gtc tcg gca ctg cgc ggc acg	144
Pro Gly Thr Leu Leu Arg Ala Arg Pro Val Ser Ala Leu Arg Gly Thr	
35 40 45	
ggc gaa ccc gtc gca gcc aag gcc tgg caa atc ctc tac cgg tcc aac	192
Gly Glu Pro Val Ala Ala Lys Ala Trp Gln Ile Leu Tyr Arg Ser Asn	
50 55 60	
tcc gcc ctt ggc atg ccg aac gcc gtc tcc ggc acc gtt ctg gtg ccg	240
Ser Ala Leu Gly Met Pro Asn Ala Val Ser Gly Thr Val Leu Val Pro	
65 70 75 80	
aac atc ccg tgg ccg cgc gaa gat cgc ccc atc atc act ttc gca gtg	288
Asn Ile Pro Trp Pro Arg Glu Asp Arg Pro Ile Ile Thr Phe Ala Val	
85 90 95	
ggc acc cac ggc ctc ggt agc caa gtt gcc ccg tcg tac ctg ctt cga	336
Gly Thr His Gly Leu Gly Ser Gln Val Ala Pro Ser Tyr Leu Leu Arg	
100 105 110	
acc gga acc gag ccg gag acc gag ctg atc gcc gtg gcc ctc gac cgc	384
Thr Gly Thr Glu Pro Glu Thr Glu Leu Ile Ala Val Ala Leu Asp Arg	
115 120 125	
ggg tgg gcc gtg gtc atc acc gac tac gaa ggc ctc ggt act cct gga	432
Gly Trp Ala Val Val Ile Thr Asp Tyr Glu Gly Leu Gly Thr Pro Gly	
130 135 140	
acc cac acc tac acc gtc ggc agg gcg cag gga cac gcc atg ctc gat	480
Thr His Thr Tyr Thr Val Gly Arg Ala Gln Gly His Ala Met Leu Asp	
145 150 155 160	
gcc gcc cgc gct gcg caa ccg cta ccg ggc tcc ggc ctg acg acc gac	528
Ala Ala Arg Ala Ala Gln Arg Leu Pro Gly Ser Gly Leu Thr Thr Asp	
165 170 175	
tgc ccg gtc ggc atc tgg ggc tat gcg cag ggt ggg caa gcg tcg gcc	576
Cys Pro Val Gly Ile Trp Gly Tyr Ala Gln Gly Gly Gln Ala Ser Ala	
180 185 190	
ttc gcc ggc gaa ctg cac ccc acc tac gca cct gaa ctg cga atc cgc	624
Phe Ala Gly Glu Leu His Pro Thr Tyr Ala Pro Glu Leu Arg Ile Arg	
195 200 205	
gct gcg gcc gca ggt gcg gtg ccg atc gat ctg ctg gac atc atc cac	672
Ala Ala Ala Ala Gly Ala Val Pro Ile Asp Leu Leu Asp Ile Ile His	
210 215 220	

Pro	Gly	Thr	Leu	Leu	Arg	Ala	Arg	Pro	Val	Ser	Ala	Leu	Arg	Gly	Thr	35	40	45	
Gly	Glu	Pro	Val	Ala	Ala	Lys	Ala	Trp	Gln	Ile	Leu	Tyr	Arg	Ser	Asn	50	55	60	
Ser	Ala	Leu	Gly	Met	Pro	Asn	Ala	Val	Ser	Gly	Thr	Val	Leu	Val	Pro	65	70	75	80
Asn	Ile	Pro	Trp	Pro	Arg	Glu	Asp	Arg	Pro	Ile	Ile	Thr	Phe	Ala	Val	85	90	95	
Gly	Thr	His	Gly	Leu	Gly	Ser	Gln	Val	Ala	Pro	Ser	Tyr	Leu	Leu	Arg	100	105	110	
Thr	Gly	Thr	Glu	Pro	Glu	Thr	Glu	Leu	Ile	Ala	Val	Ala	Leu	Asp	Arg	115	120	125	
Gly	Trp	Ala	Val	Val	Ile	Thr	Asp	Tyr	Glu	Gly	Leu	Gly	Thr	Pro	Gly	130	135	140	
Thr	His	Thr	Tyr	Thr	Val	Gly	Arg	Ala	Gln	Gly	His	Ala	Met	Leu	Asp	145	150	155	160
Ala	Ala	Arg	Ala	Ala	Gln	Arg	Leu	Pro	Gly	Ser	Gly	Leu	Thr	Thr	Asp	165	170	175	
Cys	Pro	Val	Gly	Ile	Trp	Gly	Tyr	Ala	Gln	Gly	Gly	Gln	Ala	Ser	Ala	180	185	190	
Phe	Ala	Gly	Glu	Leu	His	Pro	Thr	Tyr	Ala	Pro	Glu	Leu	Arg	Ile	Arg	195	200	205	
Ala	Ala	Ala	Ala	Gly	Ala	Val	Pro	Ile	Asp	Leu	Leu	Asp	Ile	Ile	His	210	215	220	
Arg	Asn	Asp	Gly	Val	Phe	Thr	Gly	Pro	Val	Leu	Ala	Gly	Leu	Val	Gly	225	230	235	240
His	Ala	Ala	Ala	Tyr	Pro	Asp	Leu	Pro	Phe	Asp	Glu	Leu	Leu	Thr	Glu	245	250	255	
Ala	Gly	Arg	Thr	Ala	Val	Asp	Gln	Val	Arg	Glu	Leu	Gly	Ala	Pro	Glu	260	265	270	
Leu	Val	Thr	Arg	Phe	Leu	Gly	Arg	Glu	Leu	Ser	Asp	Phe	Leu	Asp	Thr	275	280	285	
Ser	Gly	Leu	Phe	Glu	Gln	Pro	Arg	Trp	Arg	Ala	Arg	Leu	Ala	Glu	Ser	290	295	300	
Val	Ala	Gly	Arg	Asn	Gly	Gly	Pro	Val	Val	Pro	Thr	Leu	Val	Tyr	His	305	310	315	320
Ser	Thr	Asp	Asp	Glu	Ile	Val	Pro	Phe	Ala	Phe	Gly	Glu	Arg	Leu	Arg	325	330	335	

Asp Ser Tyr Arg Ala Ala Gly Thr Pro Val Arg Trp His Pro Leu Ser
 340 345 350
 Gly Leu Ala His Phe Pro Ala Ala Leu Ala Ser Ser Arg Val Val Val
 355 360 365
 Ser Trp Phe Asp Glu His Phe Ser Glu Pro Ser Ala Ile Ser Gly Pro
 370 375 380
 Arg Asp Ala Arg
 385

<210> 23
 <211> 1011
 <212> DNA
 <213> *Saccharopolyspora spinosa*

<220>
 <221> CDS
 <222> (1)..(1008)
 <223> ORF9; 2,3-reductase

<400> 23
 atg acc agc tcg atg cga aag ccg gtg cgc atc ggt gtg ctc ggg tgc 48
 Met Thr Ser Ser Met Arg Lys Pro Val Arg Ile Gly Val Leu Gly Cys
 1 5 10 15
 gct tcc ttc gcg tgg cga cgg atg ctg ccc gcg atg tgc gac gtg gcc 96
 Ala Ser Phe Ala Trp Arg Arg Met Leu Pro Ala Met Cys Asp Val Ala
 20 25 30
 gaa aca gag gtg gtg gcg gtg gcg agc cgt gat ccg gcg aaa gcc gaa 144
 Glu Thr Glu Val Val Ala Val Ala Ser Arg Asp Pro Ala Lys Ala Glu
 35 40 45
 cgg ttc gca gcg cga ttc gaa tgc gag gcg gtg ctg ggt tac cag cgg 192
 Arg Phe Ala Ala Arg Phe Glu Cys Glu Ala Val Leu Gly Tyr Gln Arg
 50 55 60
 ctc ctg gag cgg ccg gac atc gat gcc gtc tac gtg ccg ttg ccg cct 240
 Leu Leu Glu Arg Pro Asp Ile Asp Ala Val Tyr Val Pro Leu Pro Pro
 65 70 75 80
 ggc atg cat gca gag tgg atc ggc aag gcg ctt gag gca gac aaa cac 288
 Gly Met His Ala Glu Trp Ile Gly Lys Ala Leu Glu Ala Asp Lys His
 85 90 95
 gtg ctt gcg gag aaa ccg ctg acg acg acg gcg tcc gac acc gct cgc 336
 Val Leu Ala Glu Lys Pro Leu Thr Thr Thr Ala Ser Asp Thr Ala Arg
 100 105 110
 ctg gtc ggg ctg gcc agg agg aag aac ctg ctg ctg cgg gag aat tac 384
 Leu Val Gly Leu Ala Arg Arg Lys Asn Leu Leu Leu Arg Glu Asn Tyr
 115 120 125

ctg ttc ctc cac cac ggc cgg cac gac gtg gtc cgc gac ctg ctg caa	432
Leu Phe Leu His His Gly Arg His Asp Val Val Arg Asp Leu Leu Gln	
130 135 140	
tcc ggg gag atc ggt gag ctc cgg gag ttc acc gcc gtg ttc gga att	480
Ser Gly Glu Ile Gly Glu Leu Arg Glu Phe Thr Ala Val Phe Gly Ile	
145 150 155 160	
ccg ccg ctt ccc gac acg gac atc cgc tat cgc acc gaa ctc ggt ggc	528
Pro Pro Leu Pro Asp Thr Asp Ile Arg Tyr Arg Thr Glu Leu Gly Gly	
165 170 175	
gga gcg ttg ctg gac atc ggt gtc tat ccc gcc cgt gcc gct cgg cac	576
Gly Ala Leu Leu Asp Ile Gly Val Tyr Pro Ala Arg Ala Ala Arg His	
180 185 190	
ttt ctc ctc ggt ccg ctc acg gtt ctc ggc gca agc tcg cac gag gcc	624
Phe Leu Leu Gly Pro Leu Thr Val Leu Gly Ala Ser Ser His Glu Ala	
195 200 205	
cag gag tcg ggc gtc gac ttg tcg ggc agc gtg ctg ctc caa tcg gaa	672
Gln Glu Ser Gly Val Asp Leu Ser Gly Ser Val Leu Leu Gln Ser Glu	
210 215 220	
ggt ggc acc gtt gcc cac ctc gga tac ggt ttc gtg cac cac tac cgc	720
Gly Gly Thr Val Ala His Leu Gly Tyr Gly Phe Val His His Tyr Arg	
225 230 235 240	
agc gcg tac gag ctg tgg ggg agt cgt ggg cga atc gtc gtc gac cgg	768
Ser Ala Tyr Glu Leu Trp Gly Ser Arg Gly Arg Ile Val Val Asp Arg	
245 250 255	
gcg ttc acg ccg ccc gcc gag tgg cag gcc gtg atc cga atc gag cgg	816
Ala Phe Thr Pro Pro Ala Glu Trp Gln Ala Val Ile Arg Ile Glu Arg	
260 265 270	
aag ggc gtt gtc gac gag ttg tcc ttg cca gcg gaa gat cag gtt cgc	864
Lys Gly Val Val Asp Glu Leu Ser Leu Pro Ala Glu Asp Gln Val Arg	
275 280 285	
aag gcg gtc acc gcc ttc gca cgc gac atc aga gca ggg aca ggc gtg	912
Lys Ala Val Thr Ala Phe Ala Arg Asp Ile Arg Ala Gly Thr Gly Val	
290 295 300	
gac gac cct gcg gtg gcc gga gat tcg ggc gaa tcg atg atc cag cag	960
Asp Asp Pro Ala Val Ala Gly Asp Ser Gly Glu Ser Met Ile Gln Gln	
305 310 315 320	
gcc gcg ctg gtg gag gcg atc ggt cag gcc cgt cgg tgc ggg tcc aca	1008
Ala Ala Leu Val Glu Ala Ile Gly Gln Ala Arg Arg Cys Gly Ser Thr	
325 330 335	
tag	1011

<211> 336

<212> PRT

<213> Saccharopolyspora spinosa

<400> 24

Met	Thr	Ser	Ser	Met	Arg	Lys	Pro	Val	Arg	Ile	Gly	Val	Leu	Gly	Cys
1				5					10					15	

Ala	Ser	Phe	Ala	Trp	Arg	Arg	Met	Leu	Pro	Ala	Met	Cys	Asp	Val	Ala
			20					25					30		

Glu	Thr	Glu	Val	Val	Ala	Val	Ala	Ser	Arg	Asp	Pro	Ala	Lys	Ala	Glu
		35					40					45			

Arg	Phe	Ala	Ala	Arg	Phe	Glu	Cys	Glu	Ala	Val	Leu	Gly	Tyr	Gln	Arg
	50					55					60				

Leu	Leu	Glu	Arg	Pro	Asp	Ile	Asp	Ala	Val	Tyr	Val	Pro	Leu	Pro	Pro
65					70					75					80

Gly	Met	His	Ala	Glu	Trp	Ile	Gly	Lys	Ala	Leu	Glu	Ala	Asp	Lys	His
				85					90					95	

Val	Leu	Ala	Glu	Lys	Pro	Leu	Thr	Thr	Thr	Ala	Ser	Asp	Thr	Ala	Arg
			100					105					110		

Leu	Val	Gly	Leu	Ala	Arg	Arg	Lys	Asn	Leu	Leu	Leu	Arg	Glu	Asn	Tyr
	115						120					125			

Leu	Phe	Leu	His	His	Gly	Arg	His	Asp	Val	Val	Arg	Asp	Leu	Leu	Gln
	130					135					140				

Ser	Gly	Glu	Ile	Gly	Glu	Leu	Arg	Glu	Phe	Thr	Ala	Val	Phe	Gly	Ile
145					150					155					160

Pro	Pro	Leu	Pro	Asp	Thr	Asp	Ile	Arg	Tyr	Arg	Thr	Glu	Leu	Gly	Gly
				165					170					175	

Gly	Ala	Leu	Leu	Asp	Ile	Gly	Val	Tyr	Pro	Ala	Arg	Ala	Ala	Arg	His
			180					185					190		

Phe	Leu	Leu	Gly	Pro	Leu	Thr	Val	Leu	Gly	Ala	Ser	Ser	His	Glu	Ala
	195						200					205			

Gln	Glu	Ser	Gly	Val	Asp	Leu	Ser	Gly	Ser	Val	Leu	Leu	Gln	Ser	Glu
	210					215					220				

Gly	Gly	Thr	Val	Ala	His	Leu	Gly	Tyr	Gly	Phe	Val	His	His	Tyr	Arg
225					230					235					240

Ser	Ala	Tyr	Glu	Leu	Trp	Gly	Ser	Arg	Gly	Arg	Ile	Val	Val	Asp	Arg
				245					250					255	

Ala	Phe	Thr	Pro	Pro	Ala	Glu	Trp	Gln	Ala	Val	Ile	Arg	Ile	Glu	Arg
			260					265					270		

Lys	Gly	Val	Val	Asp	Glu	Leu	Ser	Leu	Pro	Ala	Glu	Asp	Gln	Val	Arg
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

275		280		285											
Lys	Ala	Val	Thr	Ala	Phe	Ala	Arg	Asp	Ile	Arg	Ala	Gly	Thr	Gly	Val
290						295					300				
Asp	Asp	Pro	Ala	Val	Ala	Gly	Asp	Ser	Gly	Glu	Ser	Met	Ile	Gln	Gln
305					310					315				320	
Ala	Ala	Leu	Val	Glu	Ala	Ile	Gly	Gln	Ala	Arg	Arg	Cys	Gly	Ser	Thr
				325					330					335	

<210> 25
 <211> 1461
 <212> DNA
 <213> Saccharopolyspora spinosa

<220>
 <221> CDS
 <222> (1)..(1458)
 <223> ORF10; 2,3-dehydratase

<400> 25	
atg agc agt tct gtc gaa gct gag gca agt gct gct gcg ccg ctc ggc	48
Met Ser Ser Ser Val Glu Ala Glu Ala Ser Ala Ala Ala Pro Leu Gly	
1 5 10 15	
agc aac aac acg cgg cgg ttc gtc gac tct gcg ctg agc gct tgc aat	96
Ser Asn Asn Thr Arg Arg Phe Val Asp Ser Ala Leu Ser Ala Cys Asn	
20 25 30	
ggc atg att ccg acc acg gag ttc cac tgc tgg ctc gcc gat cgg ctg	144
Gly Met Ile Pro Thr Thr Glu Phe His Cys Trp Leu Ala Asp Arg Leu	
35 40 45	
ggc gag aac agc ttc gag acc aat cgc atc ccg ttc gac cgc ctg tcg	192
Gly Glu Asn Ser Phe Glu Thr Asn Arg Ile Pro Phe Asp Arg Leu Ser	
50 55 60	
aaa tgg aaa ttc gat gcc agc acg gag aac ctg gtt cat gcc gac ggt	240
Lys Trp Lys Phe Asp Ala Ser Thr Glu Asn Leu Val His Ala Asp Gly	
65 70 75 80	
agg ttc ttc acg gta gaa ggc ctg cag gtc gag acc aac tat ggc gcg	288
Arg Phe Phe Thr Val Glu Gly Leu Gln Val Glu Thr Asn Tyr Gly Ala	
85 90 95	
gca ccc agc tgg cac cag ccg atc atc aac cag gct gaa gta ggt atc	336
Ala Pro Ser Trp His Gln Pro Ile Ile Asn Gln Ala Glu Val Gly Ile	
100 105 110	
ctc ggc att ctc gtc aag gag atc gac ggc gtg ctg cac tgc ctc atg	384
Leu Gly Ile Leu Val Lys Glu Ile Asp Gly Val Leu His Cys Leu Met	
115 120 125	
tca gca aag atg gaa ccg ggc aac gtc aac gtc ctg cag ctc tcg ccg	432

Ser	Ala	Lys	Met	Glu	Pro	Gly	Asn	Val	Asn	Val	Leu	Gln	Leu	Ser	Pro	
130						135					140					
acg	gtt	cag	gca	act	cgg	agc	aac	tac	acg	cag	gca	cac	cgt	ggc	agc	480
Thr	Val	Gln	Ala	Thr	Arg	Ser	Asn	Tyr	Thr	Gln	Ala	His	Arg	Gly	Ser	
145					150					155					160	
gtt	ccg	ccc	tat	gtg	gac	tac	ttc	ctc	ggg	cgg	ggc	cgc	ggc	cgc	gtg	528
Val	Pro	Pro	Tyr	Val	Asp	Tyr	Phe	Leu	Gly	Arg	Gly	Arg	Gly	Arg	Val	
				165					170						175	
ctg	gta	gac	gtg	ctc	cag	tct	gaa	cag	ggg	tcc	tgg	ttc	tac	cgg	aag	576
Leu	Val	Asp	Val	Leu	Gln	Ser	Glu	Gln	Gly	Ser	Trp	Phe	Tyr	Arg	Lys	
			180					185						190		
cgc	aac	cgg	aac	atg	gtg	gtg	gaa	gtc	cag	gag	gaa	gtg	cca	gtc	ctg	624
Arg	Asn	Arg	Asn	Met	Val	Val	Glu	Val	Gln	Glu	Glu	Val	Pro	Val	Leu	
		195					200					205				
cca	gac	ttc	tgc	tgg	ttg	acg	ctc	ggc	cag	gtg	ctg	gct	ctc	ctt	cgt	672
Pro	Asp	Phe	Cys	Trp	Leu	Thr	Leu	Gly	Gln	Val	Leu	Ala	Leu	Leu	Arg	
	210					215					220					
cag	gac	aac	atc	gtc	aac	atg	gac	acc	cgg	acg	gtg	ctg	tct	tgc	atc	720
Gln	Asp	Asn	Ile	Val	Asn	Met	Asp	Thr	Arg	Thr	Val	Leu	Ser	Cys	Ile	
225					230					235					240	
ccg	ttc	cac	gat	tcc	gcc	acc	gga	ccc	gaa	cta	gcc	gcc	tcg	gag	gag	768
Pro	Phe	His	Asp	Ser	Ala	Thr	Gly	Pro	Glu	Leu	Ala	Ala	Ser	Glu	Glu	
				245					250					255		
ccc	ttc	cga	cag	gcg	gtg	gcc	agg	tcg	ctc	tcg	cac	ggc	atc	gat	tcg	816
Pro	Phe	Arg	Gln	Ala	Val	Ala	Arg	Ser	Leu	Ser	His	Gly	Ile	Asp	Ser	
			260					265					270			
tcg	agt	atc	tcc	gag	gcg	gtc	ggc	tgg	ttc	gag	gaa	gcc	aag	gcc	cgc	864
Ser	Ser	Ile	Ser	Glu	Ala	Val	Gly	Trp	Phe	Glu	Glu	Ala	Lys	Ala	Arg	
		275					280					285				
tac	cgc	ttg	cgg	gca	acg	cgc	gtt	ccg	ctg	agc	agg	gtc	gac	aag	tgg	912
Tyr	Arg	Leu	Arg	Ala	Thr	Arg	Val	Pro	Leu	Ser	Arg	Val	Asp	Lys	Trp	
		290				295					300					
tat	cgc	acc	gat	acc	gag	atc	gcc	cac	cag	gac	ggc	aag	tac	ttc	gcg	960
Tyr	Arg	Thr	Asp	Thr	Glu	Ile	Ala	His	Gln	Asp	Gly	Lys	Tyr	Phe	Ala	
305					310					315					320	
gtg	atc	gcg	gtg	tcg	gtg	tcc	gcg	acc	aat	cgt	gag	gtc	gcc	agc	tgg	1008
Val	Ile	Ala	Val	Ser	Val	Ser	Ala	Thr	Asn	Arg	Glu	Val	Ala	Ser	Trp	
				325					330				335			
acg	cag	ccg	atg	atc	gaa	ccg	cga	gaa	caa	ggc	gag	atc	gca	ctg	ttg	1056
Thr	Gln	Pro	Met	Ile	Glu	Pro	Arg	Glu	Gln	Gly	Glu	Ile	Ala	Leu	Leu	
			340					345					350			
gtc	aag	cgg	atc	ggc	gga	gtg	ctg	cac	ggc	ttg	gtc	cac	gct	cgg	gtg	1104
Val	Lys	Arg	Ile	Gly	Gly	Val	Leu	His	Gly	Leu	Val	His	Ala	Arg	Val	

355	360	365	
gag gct ggg tat aag tgg act gcg gaa atc gct ccc acg gtc cag tgc			1152
Glu Ala Gly Tyr Lys Trp Thr Ala Glu Ile Ala Pro Thr Val Gln Cys			
370	375	380	
agt gtg gcc aac tac caa agc acc ccg tcg aac gac tgg ccg ccg ttc			1200
Ser Val Ala Asn Tyr Gln Ser Thr Pro Ser Asn Asp Trp Pro Pro Phe			
385	390	395	400
ttg gac gac gtg ctc acc gcc gat ccc gaa acc gtg cgg tac gaa tgc			1248
Leu Asp Asp Val Leu Thr Ala Asp Pro Glu Thr Val Arg Tyr Glu Ser			
405	410	415	
atc ctg tcc gaa gaa ggc ggt ccg ttc tac cag gcg cag aac agg tac			1296
Ile Leu Ser Glu Glu Gly Gly Arg Phe Tyr Gln Ala Gln Asn Arg Tyr			
420	425	430	
cgg atc atc gag gtg cat gag gac ttc gcg gca cga cct ccc agc gac			1344
Arg Ile Ile Glu Val His Glu Asp Phe Ala Ala Arg Pro Pro Ser Asp			
435	440	445	
ttc cgg tgg atg act ttg gga cag ttg ggc gag ctg ctc cgg agc acc			1392
Phe Arg Trp Met Thr Leu Gly Gln Leu Gly Glu Leu Leu Arg Ser Thr			
450	455	460	
cac ttc ttg aac atc cag gcg cgc agc ttg gtc gcc tcc ctg cat agc			1440
His Phe Leu Asn Ile Gln Ala Arg Ser Leu Val Ala Ser Leu His Ser			
465	470	475	480
ttg tgg gcg ttg ggg cga tga			1461
Leu Trp Ala Leu Gly Arg			
485			

<210> 26
 <211> 486
 <212> PRT
 <213> Saccharopolyspora spinosa

<400> 26
 Met Ser Ser Ser Val Glu Ala Glu Ala Ser Ala Ala Ala Pro Leu Gly
 1 5 10 15
 Ser Asn Asn Thr Arg Arg Phe Val Asp Ser Ala Leu Ser Ala Cys Asn
 20 25 30
 Gly Met Ile Pro Thr Thr Glu Phe His Cys Trp Leu Ala Asp Arg Leu
 35 40 45
 Gly Glu Asn Ser Phe Glu Thr Asn Arg Ile Pro Phe Asp Arg Leu Ser
 50 55 60
 Lys Trp Lys Phe Asp Ala Ser Thr Glu Asn Leu Val His Ala Asp Gly
 65 70 75 80
 Arg Phe Phe Thr Val Glu Gly Leu Gln Val Glu Thr Asn Tyr Gly Ala

85					90					95					
Ala	Pro	Ser	Trp	His	Gln	Pro	Ile	Ile	Asn	Gln	Ala	Glu	Val	Gly	Ile
			100					105					110		
Leu	Gly	Ile	Leu	Val	Lys	Glu	Ile	Asp	Gly	Val	Leu	His	Cys	Leu	Met
		115					120					125			
Ser	Ala	Lys	Met	Glu	Pro	Gly	Asn	Val	Asn	Val	Leu	Gln	Leu	Ser	Pro
	130					135					140				
Thr	Val	Gln	Ala	Thr	Arg	Ser	Asn	Tyr	Thr	Gln	Ala	His	Arg	Gly	Ser
145					150					155					160
Val	Pro	Pro	Tyr	Val	Asp	Tyr	Phe	Leu	Gly	Arg	Gly	Arg	Gly	Arg	Val
			165						170					175	
Leu	Val	Asp	Val	Leu	Gln	Ser	Glu	Gln	Gly	Ser	Trp	Phe	Tyr	Arg	Lys
		180						185					190		
Arg	Asn	Arg	Asn	Met	Val	Val	Glu	Val	Gln	Glu	Glu	Val	Pro	Val	Leu
	195						200					205			
Pro	Asp	Phe	Cys	Trp	Leu	Thr	Leu	Gly	Gln	Val	Leu	Ala	Leu	Leu	Arg
	210					215					220				
Gln	Asp	Asn	Ile	Val	Asn	Met	Asp	Thr	Arg	Thr	Val	Leu	Ser	Cys	Ile
225				230						235					240
Pro	Phe	His	Asp	Ser	Ala	Thr	Gly	Pro	Glu	Leu	Ala	Ala	Ser	Glu	Glu
			245						250					255	
Pro	Phe	Arg	Gln	Ala	Val	Ala	Arg	Ser	Leu	Ser	His	Gly	Ile	Asp	Ser
		260					265						270		
Ser	Ser	Ile	Ser	Glu	Ala	Val	Gly	Trp	Phe	Glu	Glu	Ala	Lys	Ala	Arg
	275						280					285			
Tyr	Arg	Leu	Arg	Ala	Thr	Arg	Val	Pro	Leu	Ser	Arg	Val	Asp	Lys	Trp
	290					295					300				
Tyr	Arg	Thr	Asp	Thr	Glu	Ile	Ala	His	Gln	Asp	Gly	Lys	Tyr	Phe	Ala
305				310						315					320
Val	Ile	Ala	Val	Ser	Val	Ser	Ala	Thr	Asn	Arg	Glu	Val	Ala	Ser	Trp
			325						330					335	
Thr	Gln	Pro	Met	Ile	Glu	Pro	Arg	Glu	Gln	Gly	Glu	Ile	Ala	Leu	Leu
		340						345					350		
Val	Lys	Arg	Ile	Gly	Gly	Val	Leu	His	Gly	Leu	Val	His	Ala	Arg	Val
	355						360					365			
Glu	Ala	Gly	Tyr	Lys	Trp	Thr	Ala	Glu	Ile	Ala	Pro	Thr	Val	Gln	Cys
	370					375					380				
Ser	Val	Ala	Asn	Tyr	Gln	Ser	Thr	Pro	Ser	Asn	Asp	Trp	Pro	Pro	Phe

385		390		395		400
Leu Asp Asp Val	Leu Thr Ala Asp Pro Glu Thr Val Arg Tyr Glu Ser					
	405		410		415	
Ile Leu Ser Glu Glu Gly Gly Arg Phe Tyr Gln Ala Gln Asn Arg Tyr						
	420		425		430	
Arg Ile Ile Glu Val His Glu Asp Phe Ala Ala Arg Pro Pro Ser Asp						
	435		440		445	
Phe Arg Trp Met Thr Leu Gly Gln Leu Gly Glu Leu Leu Arg Ser Thr						
	450		455		460	
His Phe Leu Asn Ile Gln Ala Arg Ser Leu Val Ala Ser Leu His Ser						
	465		470		475	480
Leu Trp Ala Leu Gly Arg						
	485					

<210> 27
 <211> 524
 <212> DNA
 <213> Saccharopolyspora spinosa

<220>
 <221> CDS
 <222> (1)..(438)
 <223> ORF11; thioesterase

<400> 27	
gtg agc aac gtg tgg ccg gaa aca tgg acg ccg ggg ttt ggc agg tgt	48
Val Ser Asn Val Trp Pro Glu Thr Trp Thr Pro Gly Phe Gly Arg Cys	
1 5 10 15	
tca tcg ctg ttg cgt cga ctc gga ttc cgc cgt gac cgg gac gat gcc	96
Ser Ser Leu Leu Arg Arg Leu Gly Phe Arg Arg Asp Arg Asp Ala	
20 25 30	
agg cga gtc ccg aag tca gat tct tgt cca gaa tcg tcc aat ggg gtg	144
Arg Arg Val Pro Lys Ser Asp Ser Cys Pro Glu Ser Ser Asn Gly Val	
35 40 45	
ttg atc tcc cca gag gtt tgc gct cca acc gat ttc cga cga gga tcg	192
Leu Ile Ser Pro Glu Val Cys Ala Pro Thr Asp Phe Arg Arg Gly Ser	
50 55 60	
tgg cgc ccg ctg agc aac gac tac cgt gcg gtc gag aca tac cgc tgt	240
Trp Arg Pro Leu Ser Asn Asp Tyr Arg Ala Val Glu Thr Tyr Arg Cys	
65 70 75 80	
gcg cca gga gcg aag gtg ggt tgc ccg atc acc gtg ctg gtg gta gat	288
Ala Pro Gly Ala Lys Val Gly Cys Pro Ile Thr Val Leu Val Val Asp	
85 90 95	

gcc gag ccg aag gtc acc ttg gat gag gcg gaa gcc tgg cga gag cac 336
 Ala Glu Pro Lys Val Thr Leu Asp Glu Ala Glu Ala Trp Arg Glu His
 100 105 110

acc gag gcc gtg gcc gac gtc cgt gtc ttc tcc ggc ggg cat ttc ttc 384
 Thr Glu Ala Val Ala Asp Val Arg Val Phe Ser Gly Gly His Phe Phe
 115 120 125

atg acc gaa cgc cag gac gag gtg ctc gcg gtc ctt acg ggc gga tcg 432
 Met Thr Glu Arg Gln Asp Glu Val Leu Ala Val Leu Thr Gly Gly Ser
 130 135 140

ctt cga tgatcctcgc caggccgctg gaccagaccg cgacgccctt gggagccggc 488
 Leu Arg
 145

gtgcacatcg tcacggcagt gagggattgg gcatga 524

<210> 28
 <211> 146
 <212> PRT
 <213> *Saccharopolyspora spinosa*

<400> 28
 Val Ser Asn Val Trp Pro Glu Thr Trp Thr Pro Gly Phe Gly Arg Cys
 1 5 10 15
 Ser Ser Leu Leu Arg Arg Leu Gly Phe Arg Arg Asp Arg Asp Asp Ala
 20 25 30
 Arg Arg Val Pro Lys Ser Asp Ser Cys Pro Glu Ser Ser Asn Gly Val
 35 40 45
 Leu Ile Ser Pro Glu Val Cys Ala Pro Thr Asp Phe Arg Arg Gly Ser
 50 55 60
 Trp Arg Pro Leu Ser Asn Asp Tyr Arg Ala Val Glu Thr Tyr Arg Cys
 65 70 75 80
 Ala Pro Gly Ala Lys Val Gly Cys Pro Ile Thr Val Leu Val Val Asp
 85 90 95
 Ala Glu Pro Lys Val Thr Leu Asp Glu Ala Glu Ala Trp Arg Glu His
 100 105 110
 Thr Glu Ala Val Ala Asp Val Arg Val Phe Ser Gly Gly His Phe Phe
 115 120 125
 Met Thr Glu Arg Gln Asp Glu Val Leu Ala Val Leu Thr Gly Gly Ser
 130 135 140
 Leu Arg
 145

<210> 29
 <211> 1320
 <212> DNA
 <213> *Saccharopolyspora spinosa*

<220>
 <221> CDS
 <222> (1)..(1317)
 <223> ORF12; glycosyltransferase

<400> 29
 atg cgt gtc ctg ttc acc ccg ctg ccg gcg agt tcg cac ttc ttc aac 48
 Met Arg Val Leu Phe Thr Pro Leu Pro Ala Ser Ser His Phe Phe Asn
 1 5 10 15

 ctg gtg ccg ttg gcg tgg gcg ttg cgt gcc gcg ggg cac gag gtc cgt 96
 Leu Val Pro Leu Ala Trp Ala Leu Arg Ala Ala Gly His Glu Val Arg
 20 25 30

 gtc gcc atc tgc ccg aat atg gtg tcg atg gtc acc gga gca gga ctc 144
 Val Ala Ile Cys Pro Asn Met Val Ser Met Val Thr Gly Ala Gly Leu
 35 40 45

 acc gcg gtt ccc gtc ggc gac gag ctc gac ctc atc tcc ttg gcg gcc 192
 Thr Ala Val Pro Val Gly Asp Glu Leu Asp Leu Ile Ser Leu Ala Ala
 50 55 60

 aag aac gaa ctc gtt ctc ggc agc ggg gtc tcg ttc gac gag aag ggg 240
 Lys Asn Glu Leu Val Leu Gly Ser Gly Val Ser Phe Asp Glu Lys Gly
 65 70 75 80

 cgg cat ccg gaa ctc ttc gac gag ctg ctg tca atc aac tcc ggc aga 288
 Arg His Pro Glu Leu Phe Asp Glu Leu Leu Ser Ile Asn Ser Gly Arg
 85 90 95

 gac acg gac gcc gtg gag caa ctc cac ctt gtg gat gac cga tcg ctg 336
 Asp Thr Asp Ala Val Glu Gln Leu His Leu Val Asp Asp Arg Ser Leu
 100 105 110

 gac gat ctc atg ggg ttc gcc gag aaa tgg cag cct gat ctc gtt gtg 384
 Asp Asp Leu Met Gly Phe Ala Glu Lys Trp Gln Pro Asp Leu Val Val
 115 120 125

 tgg gac gct atg gtg tgt tcg ggg cca gtt gtg gcg cga gcg ctc ggc 432
 Trp Asp Ala Met Val Cys Ser Gly Pro Val Val Ala Arg Ala Leu Gly
 130 135 140

 gca cga cac gtg ccg atg ctc gtc gcc ctc gat gtg tcg ggg tgg ctg 480
 Ala Arg His Val Arg Met Leu Val Ala Leu Asp Val Ser Gly Trp Leu
 145 150 155 160

 cgg tcc ggt ttc ctc gaa tac cag gaa tcg aag ccg cct gag cag cgc 528
 Arg Ser Gly Phe Leu Glu Tyr Gln Glu Ser Lys Pro Pro Glu Gln Arg
 165 170 175

 gtc gac ccg ctc ggg acg tgg ctg gga gcg aag ctc gcc aag ttc gga 576
 Val Asp Pro Leu Gly Thr Trp Leu Gly Ala Lys Leu Ala Lys Phe Gly

180						185						190						
gcc	acg	ttc	gat	gaa	gag	atc	gtg	acg	ggc	caa	gcg	acc	ata	gat	ccg	624		
Ala	Thr	Phe	Asp	Glu	Glu	Ile	Val	Thr	Gly	Gln	Ala	Thr	Ile	Asp	Pro			
		195					200					205						
att	cca	tcc	tgg	atg	cgc	ctg	cct	gtg	gac	ttg	gac	tac	atc	tcg	atg	672		
Ile	Pro	Ser	Trp	Met	Arg	Leu	Pro	Val	Asp	Leu	Asp	Tyr	Ile	Ser	Met			
		210				215					220							
cgt	ttc	gtg	ccg	tac	aac	ggg	ccg	gcg	gtg	ttg	ccg	gag	tgg	ttg	cgc	720		
Arg	Phe	Val	Pro	Tyr	Asn	Gly	Pro	Ala	Val	Leu	Pro	Glu	Trp	Leu	Arg			
225					230					235					240			
gaa	cga	ccg	acg	aag	ccg	cgc	gtc	tgc	atc	acg	cgc	ggg	ctg	acc	aag	768		
Glu	Arg	Pro	Thr	Lys	Pro	Arg	Val	Cys	Ile	Thr	Arg	Gly	Leu	Thr	Lys			
				245				250						255				
cgg	cgg	ctg	agc	agg	gtg	acc	gaa	cag	tac	ggg	gag	caa	agt	gac	cag	816		
Arg	Arg	Leu	Ser	Arg	Val	Thr	Glu	Gln	Tyr	Gly	Glu	Gln	Ser	Asp	Gln			
			260					265					270					
gaa	caa	gca	atg	gtg	gaa	agg	ttg	ttg	cgc	ggc	gcg	gcc	agg	ctc	gac	864		
Glu	Gln	Ala	Met	Val	Glu	Arg	Leu	Leu	Arg	Gly	Ala	Ala	Arg	Leu	Asp			
		275					280					285						
gtc	gag	gtg	atc	gcc	acc	ttg	tct	gac	gac	gaa	gta	cgg	gag	atg	ggg	912		
Val	Glu	Val	Ile	Ala	Thr	Leu	Ser	Asp	Asp	Glu	Val	Arg	Glu	Met	Gly			
		290				295					300							
gag	ttg	ccc	tcg	aac	gtc	cgg	gtc	cac	gaa	tac	gta	ccg	ctc	aac	gaa	960		
Glu	Leu	Pro	Ser	Asn	Val	Arg	Val	His	Glu	Tyr	Val	Pro	Leu	Asn	Glu			
305					310					315					320			
ctg	ctg	gag	tcg	tgt	tca	gtg	atc	atc	cat	cat	ggc	tcg	acg	acg	acg	1008		
Leu	Leu	Glu	Ser	Cys	Ser	Val	Ile	Ile	His	His	Gly	Ser	Thr	Thr	Thr			
				325					330					335				
cag	gaa	acc	gcc	acg	gtc	aac	ggc	gta	ccg	cag	ttg	att	ctc	cct	ggg	1056		
Gln	Glu	Thr	Ala	Thr	Val	Asn	Gly	Val	Pro	Gln	Leu	Ile	Leu	Pro	Gly			
			340					345					350					
acc	ttc	tgg	gac	gaa	tct	cgt	agg	gcg	gag	ctc	cta	gcc	gat	cgg	gga	1104		
Thr	Phe	Trp	Asp	Glu	Ser	Arg	Arg	Ala	Glu	Leu	Leu	Ala	Asp	Arg	Gly			
		355					360					365						
gcc	ggg	ctg	gtc	ctc	gac	ccc	gcg	acg	ttt	acc	gaa	gac	gac	gtg	cga	1152		
Ala	Gly	Leu	Val	Leu	Asp	Pro	Ala	Thr	Phe	Thr	Glu	Asp	Asp	Val	Arg			
		370				375					380							
ggg	cag	ctg	gcc	cgc	ctg	ctc	gac	gag	ccg	tcg	ttc	gct	gcc	aac	gcg	1200		
Gly	Gln	Leu	Ala	Arg	Leu	Leu	Asp	Glu	Pro	Ser	Phe	Ala	Ala	Asn	Ala			
385					390					395					400			
gcg	ctg	atc	cgc	cgt	gaa	atc	gag	gaa	agt	ccc	agc	ccg	cac	gac	atc	1248		
Ala	Leu	Ile	Arg	Arg	Glu	Ile	Glu	Glu	Ser	Pro	Ser	Pro	His	Asp	Ile			
				405					410					415				

gtt cca cgt ctg gaa aag cta gtt gcc gaa cgt gag aac cgc cgc act	1296
Val Pro Arg Leu Glu Lys Leu Val Ala Glu Arg Glu Asn Arg Arg Thr	
420 425 430	

ggg cag tct gat ggc cat ccg tga	1320
Gly Gln Ser Asp Gly His Pro	
435	

<210> 30
 <211> 439
 <212> PRT
 <213> Saccharopolyspora spinosa

<400> 30	
Met Arg Val Leu Phe Thr Pro Leu Pro Ala Ser Ser His Phe Phe Asn	
1 5 10 15	
Leu Val Pro Leu Ala Trp Ala Leu Arg Ala Ala Gly His Glu Val Arg	
20 25 30	
Val Ala Ile Cys Pro Asn Met Val Ser Met Val Thr Gly Ala Gly Leu	
35 40 45	
Thr Ala Val Pro Val Gly Asp Glu Leu Asp Leu Ile Ser Leu Ala Ala	
50 55 60	
Lys Asn Glu Leu Val Leu Gly Ser Gly Val Ser Phe Asp Glu Lys Gly	
65 70 75 80	
Arg His Pro Glu Leu Phe Asp Glu Leu Leu Ser Ile Asn Ser Gly Arg	
85 90 95	
Asp Thr Asp Ala Val Glu Gln Leu His Leu Val Asp Asp Arg Ser Leu	
100 105 110	
Asp Asp Leu Met Gly Phe Ala Glu Lys Trp Gln Pro Asp Leu Val Val	
115 120 125	
Trp Asp Ala Met Val Cys Ser Gly Pro Val Val Ala Arg Ala Leu Gly	
130 135 140	
Ala Arg His Val Arg Met Leu Val Ala Leu Asp Val Ser Gly Trp Leu	
145 150 155 160	
Arg Ser Gly Phe Leu Glu Tyr Gln Glu Ser Lys Pro Pro Glu Gln Arg	
165 170 175	
Val Asp Pro Leu Gly Thr Trp Leu Gly Ala Lys Leu Ala Lys Phe Gly	
180 185 190	
Ala Thr Phe Asp Glu Glu Ile Val Thr Gly Gln Ala Thr Ile Asp Pro	
195 200 205	
Ile Pro Ser Trp Met Arg Leu Pro Val Asp Leu Asp Tyr Ile Ser Met	
210 215 220	

Arg Phe Val Pro Tyr Asn Gly Pro Ala Val Leu Pro Glu Trp Leu Arg
 225 230 235 240
 Glu Arg Pro Thr Lys Pro Arg Val Cys Ile Thr Arg Gly Leu Thr Lys
 245 250 255
 Arg Arg Leu Ser Arg Val Thr Glu Gln Tyr Gly Glu Gln Ser Asp Gln
 260 265 270
 Glu Gln Ala Met Val Glu Arg Leu Leu Arg Gly Ala Ala Arg Leu Asp
 275 280 285
 Val Glu Val Ile Ala Thr Leu Ser Asp Asp Glu Val Arg Glu Met Gly
 290 295 300
 Glu Leu Pro Ser Asn Val Arg Val His Glu Tyr Val Pro Leu Asn Glu
 305 310 315 320
 Leu Leu Glu Ser Cys Ser Val Ile Ile His His Gly Ser Thr Thr Thr
 325 330 335
 Gln Glu Thr Ala Thr Val Asn Gly Val Pro Gln Leu Ile Leu Pro Gly
 340 345 350
 Thr Phe Trp Asp Glu Ser Arg Arg Ala Glu Leu Leu Ala Asp Arg Gly
 355 360 365
 Ala Gly Leu Val Leu Asp Pro Ala Thr Phe Thr Glu Asp Asp Val Arg
 370 375 380
 Gly Gln Leu Ala Arg Leu Leu Asp Glu Pro Ser Phe Ala Ala Asn Ala
 385 390 395 400
 Ala Leu Ile Arg Arg Glu Ile Glu Glu Ser Pro Ser Pro His Asp Ile
 405 410 415
 Val Pro Arg Leu Glu Lys Leu Val Ala Glu Arg Glu Asn Arg Arg Thr
 420 425 430
 Gly Gln Ser Asp Gly His Pro
 435

<210> 31
 <211> 1389
 <212> DNA
 <213> Saccharopolyspora spinosa

<220>
 <221> CDS
 <222> (1)..(1386)
 <223> ORF13; 3,4-dehydratase

<400> 31
 atg cag agc cgg aaa acc aga gcg ctg ggg aaa ggg cgc gcc aga gtg 48

Met	Gln	Ser	Arg	Lys	Thr	Arg	Ala	Leu	Gly	Lys	Gly	Arg	Ala	Arg	Val	
1				5					10					15		
act	tcg	tgt	gac	gac	act	tgc	gct	acc	gct	act	gag	atg	gtg	ccg	gat	96
Thr	Ser	Cys	Asp	Asp	Thr	Cys	Ala	Thr	Ala	Thr	Glu	Met	Val	Pro	Asp	
			20					25					30			
gcc	aag	gac	cgg	ata	ttg	gca	tcc	gta	cgc	gat	tac	cac	cgc	gaa	cag	144
Ala	Lys	Asp	Arg	Ile	Leu	Ala	Ser	Val	Arg	Asp	Tyr	His	Arg	Glu	Gln	
			35				40					45				
gaa	tcc	ccg	acc	ttc	gtg	gct	gga	tcg	acg	ccg	atc	cgg	cca	tcg	ggc	192
Glu	Ser	Pro	Thr	Phe	Val	Ala	Gly	Ser	Thr	Pro	Ile	Arg	Pro	Ser	Gly	
	50					55					60					
gcc	gtg	ctc	gac	gag	gac	gac	cgg	gtg	gca	ctg	gtg	gaa	gcc	gcg	ctg	240
Ala	Val	Leu	Asp	Glu	Asp	Asp	Arg	Val	Ala	Leu	Val	Glu	Ala	Ala	Leu	
	65				70					75					80	
gag	ctc	cgg	atc	gcc	gcg	ggc	ggg	aat	gca	cgg	cga	ttc	gag	agc	gag	288
Glu	Leu	Arg	Ile	Ala	Ala	Gly	Gly	Asn	Ala	Arg	Arg	Phe	Glu	Ser	Glu	
				85				90						95		
ttc	gcc	cgc	ttc	ttc	ggc	ctc	cgc	aag	gct	cat	ctc	gtc	aac	tcc	ggc	336
Phe	Ala	Arg	Phe	Phe	Gly	Leu	Arg	Lys	Ala	His	Leu	Val	Asn	Ser	Gly	
			100					105					110			
tcg	tcg	gcc	aat	ctc	ctg	gca	ctg	agt	tcg	ctt	acc	tcc	ccc	aaa	ctc	384
Ser	Ser	Ala	Asn	Leu	Leu	Ala	Leu	Ser	Ser	Leu	Thr	Ser	Pro	Lys	Leu	
		115					120					125				
ggc	gag	gca	cga	ctg	cgg	ccc	ggc	gac	gaa	gtg	atc	act	gcg	gcg	gtc	432
Gly	Glu	Ala	Arg	Leu	Arg	Pro	Gly	Asp	Glu	Val	Ile	Thr	Ala	Ala	Val	
	130					135					140					
ggc	ttc	ccc	acg	acg	atc	aat	ccg	gcg	gtc	caa	aac	gga	ctc	gtc	ccg	480
Gly	Phe	Pro	Thr	Thr	Ile	Asn	Pro	Ala	Val	Gln	Asn	Gly	Leu	Val	Pro	
	145				150					155					160	
gta	ttc	gtc	gac	gtg	gaa	ctg	ggc	acc	tac	aac	gca	acg	cca	gac	cgc	528
Val	Phe	Val	Asp	Val	Glu	Leu	Gly	Thr	Tyr	Asn	Ala	Thr	Pro	Asp	Arg	
				165					170					175		
atc	aag	gcc	gcc	gtc	acg	gaa	cgg	acg	cga	gcc	atc	atg	ctg	gcg	cac	576
Ile	Lys	Ala	Ala	Val	Thr	Glu	Arg	Thr	Arg	Ala	Ile	Met	Leu	Ala	His	
			180					185					190			
acc	ctg	ggc	aac	ccc	ttc	gcc	gct	gac	gaa	atc	gcg	gag	atc	gca	aaa	624
Thr	Leu	Gly	Asn	Pro	Phe	Ala	Ala	Asp	Glu	Ile	Ala	Glu	Ile	Ala	Lys	
		195					200					205				
gaa	cac	gag	ctg	ttc	ctc	gtc	gaa	gac	aac	tgt	gat	gcg	gtg	gga	tcc	672
Glu	His	Glu	Leu	Phe	Leu	Val	Glu	Asp	Asn	Cys	Asp	Ala	Val	Gly	Ser	
	210					215					220					
acc	tac	cgg	gga	cgg	ctg	acc	gga	acc	ttc	ggc	gac	ctg	aca	acg	gtc	720
Thr	Tyr	Arg	Gly	Arg	Leu	Thr	Gly	Thr	Phe	Gly	Asp	Leu	Thr	Thr	Val	

225		230		235		240	
agc ttc tat cct gcc cat cac atc acc agc ggc gag ggt ggc tgc gtg	768						
Ser Phe Tyr Pro Ala His His Ile Thr Ser Gly Glu Gly Gly Cys Val							
		245		250		255	
ttg acc ggc agc ctg gaa ttg gct cgc atc atc gag tcg ctg cgt gac	816						
Leu Thr Gly Ser Leu Glu Leu Ala Arg Ile Ile Glu Ser Leu Arg Asp							
		260		265		270	
tgg gga cgg gat tgc tgg tgc gag ccc ggc gtg gac aac acc tgc cgc	864						
Trp Gly Arg Asp Cys Trp Cys Glu Pro Gly Val Asp Asn Thr Cys Arg							
		275		280		285	
aag agg ttc gac tac cac ctc ggt acc ctt cca ccg ggc tac gac cac	912						
Lys Arg Phe Asp Tyr His Leu Gly Thr Leu Pro Pro Gly Tyr Asp His							
		290		295		300	
aag tac acg ttc tcc cac gtc ggt tac aac ctc aag acc acc gac ctg	960						
Lys Tyr Thr Phe Ser His Val Gly Tyr Asn Leu Lys Thr Thr Asp Leu							
		305		310		315	
cag gcc gca ctt gcg ctg agc cag ttg agc aag att tcc gca ttc ggg	1008						
Gln Ala Ala Leu Ala Leu Ser Gln Leu Ser Lys Ile Ser Ala Phe Gly							
		325		330		335	
tcg gca cgc cgc cgt aac tgg cga cgg ttg cgc gaa ggg ctg tcc ggg	1056						
Ser Ala Arg Arg Arg Asn Trp Arg Arg Leu Arg Glu Gly Leu Ser Gly							
		340		345		350	
ttg ccg ggc ctg ctg ctg ccg gta gcc aca ccg cac agc gac ccg agc	1104						
Leu Pro Gly Leu Leu Leu Pro Val Ala Thr Pro His Ser Asp Pro Ser							
		355		360		365	
tgg ttc ggg ttt gcg atc acc atc agt gcg gac gcc ggg ttc acc cgt	1152						
Trp Phe Gly Phe Ala Ile Thr Ile Ser Ala Asp Ala Gly Phe Thr Arg							
		370		375		380	
gcc gcc ctg gtg aac ttc ctg gaa tcc cgc aac atc ggc acc cga ctg	1200						
Ala Ala Leu Val Asn Phe Leu Glu Ser Arg Asn Ile Gly Thr Arg Leu							
		385		390		395	
ctg ttc ggc ggt aac atc acc cgg cac ccg gcc ttc gag cag gtg cgg	1248						
Leu Phe Gly Gly Asn Ile Thr Arg His Pro Ala Phe Glu Gln Val Arg							
		405		410		415	
tac cgg atc gcc gac gcg ctc acc aac agc gac atc gtc acc gac cga	1296						
Tyr Arg Ile Ala Asp Ala Leu Thr Asn Ser Asp Ile Val Thr Asp Arg							
		420		425		430	
acc ttc tgg gtc ggc gtc tac cca ggc ata acg gac caa atg atc gac	1344						
Thr Phe Trp Val Gly Val Tyr Pro Gly Ile Thr Asp Gln Met Ile Asp							
		435		440		445	
tac gtc gtc gaa tca atc gct gaa ttc gtg gcc aag agt tcc tag	1389						
Tyr Val Val Glu Ser Ile Ala Glu Phe Val Ala Lys Ser Ser							
		450		455		460	

<210> 32
<211> 462
<212> PRT
<213> Saccharopolyspora spinosa

<400> 32

Met	Gln	Ser	Arg	Lys	Thr	Arg	Ala	Leu	Gly	Lys	Gly	Arg	Ala	Arg	Val
1				5					10					15	
Thr	Ser	Cys	Asp	Asp	Thr	Cys	Ala	Thr	Ala	Thr	Glu	Met	Val	Pro	Asp
			20					25					30		
Ala	Lys	Asp	Arg	Ile	Leu	Ala	Ser	Val	Arg	Asp	Tyr	His	Arg	Glu	Gln
		35					40					45			
Glu	Ser	Pro	Thr	Phe	Val	Ala	Gly	Ser	Thr	Pro	Ile	Arg	Pro	Ser	Gly
	50					55					60				
Ala	Val	Leu	Asp	Glu	Asp	Asp	Arg	Val	Ala	Leu	Val	Glu	Ala	Ala	Leu
65					70					75					80
Glu	Leu	Arg	Ile	Ala	Ala	Gly	Gly	Asn	Ala	Arg	Arg	Phe	Glu	Ser	Glu
				85					90					95	
Phe	Ala	Arg	Phe	Phe	Gly	Leu	Arg	Lys	Ala	His	Leu	Val	Asn	Ser	Gly
			100					105					110		
Ser	Ser	Ala	Asn	Leu	Leu	Ala	Leu	Ser	Ser	Leu	Thr	Ser	Pro	Lys	Leu
		115					120					125			
Gly	Glu	Ala	Arg	Leu	Arg	Pro	Gly	Asp	Glu	Val	Ile	Thr	Ala	Ala	Val
	130					135					140				
Gly	Phe	Pro	Thr	Thr	Ile	Asn	Pro	Ala	Val	Gln	Asn	Gly	Leu	Val	Pro
145					150					155					160
Val	Phe	Val	Asp	Val	Glu	Leu	Gly	Thr	Tyr	Asn	Ala	Thr	Pro	Asp	Arg
				165					170					175	
Ile	Lys	Ala	Ala	Val	Thr	Glu	Arg	Thr	Arg	Ala	Ile	Met	Leu	Ala	His
			180					185					190		
Thr	Leu	Gly	Asn	Pro	Phe	Ala	Ala	Asp	Glu	Ile	Ala	Glu	Ile	Ala	Lys
		195					200					205			
Glu	His	Glu	Leu	Phe	Leu	Val	Glu	Asp	Asn	Cys	Asp	Ala	Val	Gly	Ser
	210					215					220				
Thr	Tyr	Arg	Gly	Arg	Leu	Thr	Gly	Thr	Phe	Gly	Asp	Leu	Thr	Thr	Val
225					230					235					240
Ser	Phe	Tyr	Pro	Ala	His	His	Ile	Thr	Ser	Gly	Glu	Gly	Gly	Cys	Val
				245					250					255	
Leu	Thr	Gly	Ser	Leu	Glu	Leu	Ala	Arg	Ile	Ile	Glu	Ser	Leu	Arg	Asp

260					265					270					
Trp	Gly	Arg	Asp	Cys	Trp	Cys	Glu	Pro	Gly	Val	Asp	Asn	Thr	Cys	Arg
	275						280					285			
Lys	Arg	Phe	Asp	Tyr	His	Leu	Gly	Thr	Leu	Pro	Pro	Gly	Tyr	Asp	His
	290					295					300				
Lys	Tyr	Thr	Phe	Ser	His	Val	Gly	Tyr	Asn	Leu	Lys	Thr	Thr	Asp	Leu
305					310					315					320
Gln	Ala	Ala	Leu	Ala	Leu	Ser	Gln	Leu	Ser	Lys	Ile	Ser	Ala	Phe	Gly
			325						330					335	
Ser	Ala	Arg	Arg	Arg	Asn	Trp	Arg	Arg	Leu	Arg	Glu	Gly	Leu	Ser	Gly
			340					345					350		
Leu	Pro	Gly	Leu	Leu	Leu	Pro	Val	Ala	Thr	Pro	His	Ser	Asp	Pro	Ser
		355					360					365			
Trp	Phe	Gly	Phe	Ala	Ile	Thr	Ile	Ser	Ala	Asp	Ala	Gly	Phe	Thr	Arg
	370					375					380				
Ala	Ala	Leu	Val	Asn	Phe	Leu	Glu	Ser	Arg	Asn	Ile	Gly	Thr	Arg	Leu
385					390					395					400
Leu	Phe	Gly	Gly	Asn	Ile	Thr	Arg	His	Pro	Ala	Phe	Glu	Gln	Val	Arg
				405					410					415	
Tyr	Arg	Ile	Ala	Asp	Ala	Leu	Thr	Asn	Ser	Asp	Ile	Val	Thr	Asp	Arg
			420					425					430		
Thr	Phe	Trp	Val	Gly	Val	Tyr	Pro	Gly	Ile	Thr	Asp	Gln	Met	Ile	Asp
		435					440					445			
Tyr	Val	Val	Glu	Ser	Ile	Ala	Glu	Phe	Val	Ala	Lys	Ser	Ser		
	450					455					460				

<210> 33
 <211> 1158
 <212> DNA
 <213> Saccharopolyspora spinosa

<220>
 <221> CDS
 <222> (1)..(1155)
 <223> ORF14; 4-aminotransferase

<400> 33																
gtg	atc	aac	ctg	cac	cag	ccg	atc	ctc	ggc	acc	gaa	gaa	ctc	gac	gcg	48
Val	Ile	Asn	Leu	His	Gln	Pro	Ile	Leu	Gly	Thr	Glu	Glu	Leu	Asp	Ala	
1				5					10					15		
atc	gcg	gag	gtg	ttc	gcc	tcc	aac	tgg	atc	ggg	ctc	ggg	ccg	cgc	acc	96
Ile	Ala	Glu	Val	Phe	Ala	Ser	Asn	Trp	Ile	Gly	Leu	Gly	Pro	Arg	Thr	

20										25					30					
cg	ac	tt	ga	gc	ga	tt	gc	ca	ca	ct	gg	gt	ga	cc	ga	144				
Arg	Thr	Phe	Glu	Ala	Glu	Phe	Ala	His	His	Leu	Gly	Val	Asp	Pro	Glu					
35			40					45												
ca	gt	gt	tt	ct	aa	tc	gg	ac	gc	gc	ct	tt	ct	ac	gt	192				
Gln	Val	Val	Phe	Leu	Asn	Ser	Gly	Thr	Ala	Ala	Leu	Phe	Leu	Thr	Val					
50			55					60												
ca	gt	ct	ga	ct	gg	cc	gg	ga	ga	gt	gt	ct	cc	tc	at	240				
Gln	Val	Leu	Asp	Leu	Gly	Pro	Gly	Asp	Asp	Val	Val	Leu	Pro	Ser	Ile					
65			70					75			80									
ag	tt	gt	gc	gc	gc	aa	gc	at	gc	tc	tc	gg	gc	cg	cc	288				
Ser	Phe	Val	Ala	Ala	Ala	Asn	Ala	Ile	Ala	Ser	Ser	Gly	Ala	Arg	Pro					
85					90					95										
gt	tt	tg	ga	gt	ga	cc	cg	ac	tt	aa	cc	ac	ct	ga	ga	336				
Val	Phe	Cys	Asp	Val	Asp	Pro	Arg	Thr	Leu	Asn	Pro	Thr	Leu	Asp	Asp					
100			105					110												
gt	gc	ag	gc	at	ac	cc	gc	ac	aa	gc	gt	tt	ct	ct	ca	384				
Val	Ala	Arg	Ala	Ile	Thr	Pro	Ala	Thr	Lys	Ala	Val	Leu	Leu	Leu	His					
115			120					125												
ta	ga	ga	tc	cc	ga	ga	gt	ac	gc	at	gc	ga	tt	tg	cg	432				
Tyr	Gly	Gly	Ser	Pro	Gly	Glu	Val	Thr	Ala	Ile	Ala	Asp	Phe	Cys	Arg					
130			135					140												
ga	aa	gg	ct	at	ct	at	ga	ga	tc	gc	tg	gc	gt	ga	tc	480				
Glu	Lys	Gly	Leu	Met	Leu	Ile	Glu	Asp	Ser	Ala	Cys	Ala	Val	Ala	Ser					
145			150					155			160									
tc	gt	ca	gg	ac	gc	tg	ga	ac	tt	gg	ga	ct	gc	ac	tg	528				
Ser	Val	His	Gly	Thr	Ala	Cys	Gly	Thr	Phe	Gly	Asp	Leu	Ala	Thr	Trp					
165					170					175										
ag	tt	ga	gc	at	aa	at	ct	gt	ac	gg	ga	gg	gg	at	tt	576				
Ser	Phe	Asp	Ala	Met	Lys	Ile	Leu	Val	Thr	Gly	Asp	Gly	Gly	Met	Phe					
180			185					190												
ta	gc	gc	ga	cc	ga	ct	gc	ca	cg	gc	aa	ca	ct	gc	ta	624				
Tyr	Ala	Ala	Asp	Pro	Glu	Leu	Ala	His	Arg	Ala	Arg	Arg	Leu	Ala	Tyr					
195			200					205												
ca	gg	ct	ga	ca	at	ag	ga	tt	ga	tc	gc	aa	tc	tc	aa	672				
His	Gly	Leu	Glu	Gln	Met	Ser	Gly	Phe	Asp	Ser	Ala	Lys	Ser	Ser	Asn					
210			215					220												
cg	tg	tg	ga	at	cg	gt	ga	ga	at	gg	ca	cg	ct	at	gg	720				
Arg	Trp	Trp	Asp	Ile	Arg	Val	Glu	Asp	Ile	Gly	Gln	Arg	Leu	Ile	Gly					
225			230					235			240									
aa	ga	at	ac	gc	gc	ct	gg	ag	gt	ca	ct	cg	aa	ct	cc	768				
Asn	Asp	Met	Thr	Ala	Ala	Leu	Gly	Ser	Val	Gln	Leu	Arg	Lys	Leu	Pro					
245					250					255										

gaa ttc atc aac agg cgt aga gaa atc gct acg cag tac gac cgg ttg	816
Glu Phe Ile Asn Arg Arg Arg Glu Ile Ala Thr Gln Tyr Asp Arg Leu	
260 265 270	
ctt tcc gat gtg ccg ggt gtc ctc cta ccg ccg acg cta ccg gat ggg	864
Leu Ser Asp Val Pro Gly Val Leu Leu Pro Pro Thr Leu Pro Asp Gly	
275 280 285	
cac gtc tcg tca cac tac ttc tac tgg gtc cag ctg gct ccg gag atc	912
His Val Ser Ser His Tyr Phe Tyr Trp Val Gln Leu Ala Pro Glu Ile	
290 295 300	
cgc gac cag gtg gcg cag caa atg ctg gaa cgc ggc atc tac acg agc	960
Arg Asp Gln Val Ala Gln Gln Met Leu Glu Arg Gly Ile Tyr Thr Ser	
305 310 315 320	
tac cgc tac ccg ccc ctg cac aag gtc ccc atc tac cgc gcg gac tgc	1008
Tyr Arg Tyr Pro Pro Leu His Lys Val Pro Ile Tyr Arg Ala Asp Cys	
325 330 335	
aag ctg cct tct gcg gag cac gcc tgc cgc aga aca ctc ctg cta cca	1056
Lys Leu Pro Ser Ala Glu His Ala Cys Arg Arg Thr Leu Leu Leu Pro	
340 345 350	
ctg cac cca agc ctt gac gac gcc gag gtg cgc acg gtg gct gac gag	1104
Leu His Pro Ser Leu Asp Asp Ala Glu Val Arg Thr Val Ala Asp Glu	
355 360 365	
ttc cag aag gcc gtc gaa cac cac atc agc caa aga tca cca ctc cga	1152
Phe Gln Lys Ala Val Glu His His Ile Ser Gln Arg Ser Pro Leu Arg	
370 375 380	
aag tga	1158
Lys	
385	

<210> 34

<211> 385

<212> PRT

<213> Saccharopolyspora spinosa

<400> 34

Val	Ile	Asn	Leu	His	Gln	Pro	Ile	Leu	Gly	Thr	Glu	Glu	Leu	Asp	Ala
1				5					10					15	

Ile	Ala	Glu	Val	Phe	Ala	Ser	Asn	Trp	Ile	Gly	Leu	Gly	Pro	Arg	Thr
			20					25					30		

Arg	Thr	Phe	Glu	Ala	Glu	Phe	Ala	His	His	Leu	Gly	Val	Asp	Pro	Glu
		35					40					45			

Gln	Val	Val	Phe	Leu	Asn	Ser	Gly	Thr	Ala	Ala	Leu	Phe	Leu	Thr	Val
	50					55					60				

Gln	Val	Leu	Asp	Leu	Gly	Pro	Gly	Asp	Asp	Val	Val	Leu	Pro	Ser	Ile
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

65					70					75				80	
Ser	Phe	Val	Ala	Ala	Ala	Asn	Ala	Ile	Ala	Ser	Ser	Gly	Ala	Arg	Pro
				85					90					95	
Val	Phe	Cys	Asp	Val	Asp	Pro	Arg	Thr	Leu	Asn	Pro	Thr	Leu	Asp	Asp
			100					105					110		
Val	Ala	Arg	Ala	Ile	Thr	Pro	Ala	Thr	Lys	Ala	Val	Leu	Leu	Leu	His
		115					120					125			
Tyr	Gly	Gly	Ser	Pro	Gly	Glu	Val	Thr	Ala	Ile	Ala	Asp	Phe	Cys	Arg
	130					135					140				
Glu	Lys	Gly	Leu	Met	Leu	Ile	Glu	Asp	Ser	Ala	Cys	Ala	Val	Ala	Ser
145					150					155					160
Ser	Val	His	Gly	Thr	Ala	Cys	Gly	Thr	Phe	Gly	Asp	Leu	Ala	Thr	Trp
			165						170					175	
Ser	Phe	Asp	Ala	Met	Lys	Ile	Leu	Val	Thr	Gly	Asp	Gly	Gly	Met	Phe
		180						185					190		
Tyr	Ala	Ala	Asp	Pro	Glu	Leu	Ala	His	Arg	Ala	Arg	Arg	Leu	Ala	Tyr
	195						200					205			
His	Gly	Leu	Glu	Gln	Met	Ser	Gly	Phe	Asp	Ser	Ala	Lys	Ser	Ser	Asn
	210					215					220				
Arg	Trp	Trp	Asp	Ile	Arg	Val	Glu	Asp	Ile	Gly	Gln	Arg	Leu	Ile	Gly
225				230						235					240
Asn	Asp	Met	Thr	Ala	Ala	Leu	Gly	Ser	Val	Gln	Leu	Arg	Lys	Leu	Pro
			245						250					255	
Glu	Phe	Ile	Asn	Arg	Arg	Arg	Glu	Ile	Ala	Thr	Gln	Tyr	Asp	Arg	Leu
		260						265					270		
Leu	Ser	Asp	Val	Pro	Gly	Val	Leu	Leu	Pro	Pro	Thr	Leu	Pro	Asp	Gly
		275					280					285			
His	Val	Ser	Ser	His	Tyr	Phe	Tyr	Trp	Val	Gln	Leu	Ala	Pro	Glu	Ile
	290					295					300				
Arg	Asp	Gln	Val	Ala	Gln	Gln	Met	Leu	Glu	Arg	Gly	Ile	Tyr	Thr	Ser
305					310					315					320
Tyr	Arg	Tyr	Pro	Pro	Leu	His	Lys	Val	Pro	Ile	Tyr	Arg	Ala	Asp	Cys
			325						330					335	
Lys	Leu	Pro	Ser	Ala	Glu	His	Ala	Cys	Arg	Arg	Thr	Leu	Leu	Leu	Pro
			340					345					350		
Leu	His	Pro	Ser	Leu	Asp	Asp	Ala	Glu	Val	Arg	Thr	Val	Ala	Asp	Glu
	355						360					365			
Phe	Gln	Lys	Ala	Val	Glu	His	His	Ile	Ser	Gln	Arg	Ser	Pro	Leu	Arg

370
 Lys
 385

375
 380

<210> 35
 <211> 750
 <212> DNA
 <213> Saccharopolyspora spinosa

<220>
 <221> CDS
 <222> (1)..(747)
 <223> ORF15; N-dimethyltransferase

<400> 35
 atg tcg cgc gtg agc gac aca ttc gca gaa acc tcc tcg gta tac agc 48
 Met Ser Arg Val Ser Asp Thr Phe Ala Glu Thr Ser Ser Val Tyr Ser
 1 5 10 15
 cca gat cat gcc gac atc tac gac gcg atc cac tcc gcg cgt ggc cgg 96
 Pro Asp His Ala Asp Ile Tyr Asp Ala Ile His Ser Ala Arg Gly Arg
 20 25 30
 gac tgg gca gcc gag gcc ggg gaa gta gtc cag ctc gta cgc acc agg 144
 Asp Trp Ala Ala Glu Ala Gly Glu Val Val Gln Leu Val Arg Thr Arg
 35 40 45
 ctg ccc gaa gca cag tcc cta ctc gac gtc gcc tgt ggg acc ggg gcg 192
 Leu Pro Glu Ala Gln Ser Leu Leu Asp Val Ala Cys Gly Thr Gly Ala
 50 55 60
 cac cta gag cga ttc cgt gcc gaa tac gcg aag gtc gcg ggg ctt gaa 240
 His Leu Glu Arg Phe Arg Ala Glu Tyr Ala Lys Val Ala Gly Leu Glu
 65 70 75 80
 ctg tcc gat gcg atg cgg gag atc gcg atc aga cga gtc cct gag gta 288
 Leu Ser Asp Ala Met Arg Glu Ile Ala Ile Arg Arg Val Pro Glu Val
 85 90 95
 ccg att cac atc ggt gac atc cgc gat ttc gac ctc ggc gag cca ttc 336
 Pro Ile His Ile Gly Asp Ile Arg Asp Phe Asp Leu Gly Glu Pro Phe
 100 105 110
 gac gtc atc acc tgc ctg tgc ttt acc gcg gct tac atg cgg acc gtt 384
 Asp Val Ile Thr Cys Leu Cys Phe Thr Ala Ala Tyr Met Arg Thr Val
 115 120 125
 gac gac ctg cga cgc gtg acg cgg aac atg gcc cgg cac ctg gcc cct 432
 Asp Asp Leu Arg Arg Val Thr Arg Asn Met Ala Arg His Leu Ala Pro
 130 135 140
 ggt gga gtc gcg gtc atc gaa ccc tgg tgg ttt ccc gac aag ttc atc 480
 Gly Gly Val Ala Val Ile Glu Pro Trp Trp Phe Pro Asp Lys Phe Ile
 145 150 155 160

gac ggg ttc gtc acc gga gcc gtc gcg cac cac ggc gag cgg gtg atc 528
 Asp Gly Phe Val Thr Gly Ala Val Ala His His Gly Glu Arg Val Ile
 165 170 175
 agc cgg cta tcg cac tcg gtc ctg gag ggc cgt acg agc cgg atg acc 576
 Ser Arg Leu Ser His Ser Val Leu Glu Gly Arg Thr Ser Arg Met Thr
 180 185 190
 gtc cgc tac aca gtc gcc gaa ccc acc ggg atc cgg gac ttc aca gag 624
 Val Arg Tyr Thr Val Ala Glu Pro Thr Gly Ile Arg Asp Phe Thr Glu
 195 200 205
 ttc gaa atc ctc tcg ctg ttc act gag gac gag tac acc gcc gcg ctc 672
 Phe Glu Ile Leu Ser Leu Phe Thr Glu Asp Glu Tyr Thr Ala Ala Leu
 210 215 220
 gaa gac gca ggg atc cgc gcg gaa tac ctt cct gga gca ccg aac ggc 720
 Glu Asp Ala Gly Ile Arg Ala Glu Tyr Leu Pro Gly Ala Pro Asn Gly
 225 230 235 240
 cga ggc ctg ttc gtc gga atc cgc aac tga 750
 Arg Gly Leu Phe Val Gly Ile Arg Asn
 245

<210> 36
 <211> 249
 <212> PRT
 <213> Saccharopolyspora spinosa

<400> 36
 Met Ser Arg Val Ser Asp Thr Phe Ala Glu Thr Ser Ser Val Tyr Ser
 1 5 10 15
 Pro Asp His Ala Asp Ile Tyr Asp Ala Ile His Ser Ala Arg Gly Arg
 20 25 30
 Asp Trp Ala Ala Glu Ala Gly Glu Val Val Gln Leu Val Arg Thr Arg
 35 40 45
 Leu Pro Glu Ala Gln Ser Leu Leu Asp Val Ala Cys Gly Thr Gly Ala
 50 55 60
 His Leu Glu Arg Phe Arg Ala Glu Tyr Ala Lys Val Ala Gly Leu Glu
 65 70 75 80
 Leu Ser Asp Ala Met Arg Glu Ile Ala Ile Arg Arg Val Pro Glu Val
 85 90 95
 Pro Ile His Ile Gly Asp Ile Arg Asp Phe Asp Leu Gly Glu Pro Phe
 100 105 110
 Asp Val Ile Thr Cys Leu Cys Phe Thr Ala Ala Tyr Met Arg Thr Val
 115 120 125
 Asp Asp Leu Arg Arg Val Thr Arg Asn Met Ala Arg His Leu Ala Pro

130	135	140
Gly Gly Val Ala Val Ile Glu Pro Trp Trp Phe Pro Asp Lys Phe Ile		
145	150	155 160
Asp Gly Phe Val Thr Gly Ala Val Ala His His Gly Glu Arg Val Ile		
	165	170 175
Ser Arg Leu Ser His Ser Val Leu Glu Gly Arg Thr Ser Arg Met Thr		
	180	185 190
Val Arg Tyr Thr Val Ala Glu Pro Thr Gly Ile Arg Asp Phe Thr Glu		
	195	200 205
Phe Glu Ile Leu Ser Leu Phe Thr Glu Asp Glu Tyr Thr Ala Ala Leu		
	210	215 220
Glu Asp Ala Gly Ile Arg Ala Glu Tyr Leu Pro Gly Ala Pro Asn Gly		
225	230	235 240
Arg Gly Leu Phe Val Gly Ile Arg Asn		
	245	

<210> 37
 <211> 726
 <212> DNA
 <213> Saccharopolyspora spinosa

<220>
 <221> CDS
 <222> (1)..(723)
 <223> ORF16; 3,4-reductase

<400> 37	
atg agc gaa cag acg att gca ctg gtc acc ggc gca aac aag gga atc	48
Met Ser Glu Gln Thr Ile Ala Leu Val Thr Gly Ala Asn Lys Gly Ile	
1 5 10 15	
gga tac gag atc gcg gcc ggg ctc ggc gcg ctg ggg tgg agc gtc gga	96
Gly Tyr Glu Ile Ala Ala Gly Leu Gly Ala Leu Gly Trp Ser Val Gly	
20 25 30	
atc ggg gca cgg gac cac cag cgc ggg gag gat gcc gtg gcg aaa ttg	144
Ile Gly Ala Arg Asp His Gln Arg Gly Glu Asp Ala Val Ala Lys Leu	
35 40 45	
cgt gcg gac ggc gtc gat gcg ttc gcg gta tcc ctg gac gtg aca gac	192
Arg Ala Asp Gly Val Asp Ala Phe Ala Val Ser Leu Asp Val Thr Asp	
50 55 60	
gac gcg agc gtc gcg gct gct gcg gct ctg ctc gag gag cgc gcc ggc	240
Asp Ala Ser Val Ala Ala Ala Ala Ala Leu Leu Glu Glu Arg Ala Gly	
65 70 75 80	
cgg ctc gat gtg ctg gtt aat aac gcc ggc atc gcc ggg gca tgg ccg	288

Arg	Leu	Asp	Val	Leu	Val	Asn	Asn	Ala	Gly	Ile	Ala	Gly	Ala	Trp	Pro	
				85					90					95		
gag	gag	ccc	tcg	acc	gtc	aca	ccg	gcg	agc	ctc	cgg	gcg	gtg	gtg	gag	336
Glu	Glu	Pro	Ser	Thr	Val	Thr	Pro	Ala	Ser	Leu	Arg	Ala	Val	Val	Glu	
			100					105					110			
acc	aac	gtg	atc	ggc	gtc	gtt	cgg	gtt	acc	aac	gct	atg	ctg	ccg	ttg	384
Thr	Asn	Val	Ile	Gly	Val	Val	Arg	Val	Thr	Asn	Ala	Met	Leu	Pro	Leu	
		115					120					125				
cta	cgc	cgc	tcc	gag	cgc	ccg	cgg	atc	gtc	aac	cag	tcc	agc	cac	gtc	432
Leu	Arg	Arg	Ser	Glu	Arg	Pro	Arg	Ile	Val	Asn	Gln	Ser	Ser	His	Val	
	130					135					140					
gct	tcc	ctg	acc	ttg	caa	acc	acg	ccg	ggc	gtc	gac	ctc	ggc	ggg	atc	480
Ala	Ser	Leu	Thr	Leu	Gln	Thr	Thr	Pro	Gly	Val	Asp	Leu	Gly	Gly	Ile	
145				150						155					160	
agc	gga	gcc	tac	tca	ccg	tcg	aag	acg	ttc	ctc	aac	gcg	atc	acc	atc	528
Ser	Gly	Ala	Tyr	Ser	Pro	Ser	Lys	Thr	Phe	Leu	Asn	Ala	Ile	Thr	Ile	
			165					170					175			
cag	tac	gcc	aag	gaa	ctc	agc	gat	acc	aac	atc	aaa	atc	aac	aac	gcc	576
Gln	Tyr	Ala	Lys	Glu	Leu	Ser	Asp	Thr	Asn	Ile	Lys	Ile	Asn	Asn	Ala	
		180					185					190				
tgc	ccc	ggc	tac	gtc	gcg	acc	gac	ctt	aac	ggc	ttc	cac	gga	acc	agc	624
Cys	Pro	Gly	Tyr	Val	Ala	Thr	Asp	Leu	Asn	Gly	Phe	His	Gly	Thr	Ser	
	195					200					205					
acg	ccg	gca	gac	ggg	gcc	agg	atc	gcc	att	cgg	ctc	gcc	acg	ctg	cca	672
Thr	Pro	Ala	Asp	Gly	Ala	Arg	Ile	Ala	Ile	Arg	Leu	Ala	Thr	Leu	Pro	
	210				215					220						
gac	gac	ggc	ccg	acc	gga	ggc	atg	ttc	gac	gac	gcc	ggg	aat	gtg	ccc	720
Asp	Asp	Gly	Pro	Thr	Gly	Gly	Met	Phe	Asp	Asp	Ala	Gly	Asn	Val	Pro	
225				230					235					240		
tgg	tga															726
Trp																

<210> 38
 <211> 241
 <212> PRT
 <213> Saccharopolyspora spinosa

<400> 38
 Met Ser Glu Gln Thr Ile Ala Leu Val Thr Gly Ala Asn Lys Gly Ile
 1 5 10 15
 Gly Tyr Glu Ile Ala Ala Gly Leu Gly Ala Leu Gly Trp Ser Val Gly
 20 25 30
 Ile Gly Ala Arg Asp His Gln Arg Gly Glu Asp Ala Val Ala Lys Leu
 35 40 45

Arg Ala Asp Gly Val Asp Ala Phe Ala Val Ser Leu Asp Val Thr Asp
 50 55 60
 Asp Ala Ser Val Ala Ala Ala Ala Leu Leu Glu Glu Arg Ala Gly
 65 70 75 80
 Arg Leu Asp Val Leu Val Asn Asn Ala Gly Ile Ala Gly Ala Trp Pro
 85 90 95
 Glu Glu Pro Ser Thr Val Thr Pro Ala Ser Leu Arg Ala Val Val Glu
 100 105 110
 Thr Asn Val Ile Gly Val Val Arg Val Thr Asn Ala Met Leu Pro Leu
 115 120 125
 Leu Arg Arg Ser Glu Arg Pro Arg Ile Val Asn Gln Ser Ser His Val
 130 135 140
 Ala Ser Leu Thr Leu Gln Thr Thr Pro Gly Val Asp Leu Gly Gly Ile
 145 150 155 160
 Ser Gly Ala Tyr Ser Pro Ser Lys Thr Phe Leu Asn Ala Ile Thr Ile
 165 170 175
 Gln Tyr Ala Lys Glu Leu Ser Asp Thr Asn Ile Lys Ile Asn Asn Ala
 180 185 190
 Cys Pro Gly Tyr Val Ala Thr Asp Leu Asn Gly Phe His Gly Thr Ser
 195 200 205
 Thr Pro Ala Asp Gly Ala Arg Ile Ala Ile Arg Leu Ala Thr Leu Pro
 210 215 220
 Asp Asp Gly Pro Thr Gly Gly Met Phe Asp Asp Ala Gly Asn Val Pro
 225 230 235 240
 Trp

<210> 39
 <211> 837
 <212> DNA
 <213> Saccharopolyspora spinosa

 <220>
 <221> CDS
 <222> (1)..(834)
 <223> ORF17; transcription regulator

<400> 39
 atg gag acg cgg gag ttg cgg tac ttc gtt gca gtc gcc gag gag ttg 48
 Met Glu Thr Arg Glu Leu Arg Tyr Phe Val Ala Val Ala Glu Glu Leu
 1 5 10 15

cac ttc ggc cgg gcc gcc cag cgc ctg ggc atc gcc cag ccg ccg ctg	96
His Phe Gly Arg Ala Ala Gln Arg Leu Gly Ile Ala Gln Pro Pro Leu	
20 25 30	
tcg cgg acg atc gcc cag ctc gag caa cga ctc gga gtc gtg ttg ctg	144
Ser Arg Thr Ile Ala Gln Leu Glu Gln Arg Leu Gly Val Val Leu Leu	
35 40 45	
caa cgc acc agc cgc aaa gtc tcg ctc acc gaa gcc ggg gca atg ctg	192
Gln Arg Thr Ser Arg Lys Val Ser Leu Thr Glu Ala Gly Ala Met Leu	
50 55 60	
ctg acc gaa ggc cgg gcg atc ctc ggc gcg ctg gca gca gcc gag cga	240
Leu Thr Glu Gly Arg Ala Ile Leu Gly Ala Leu Ala Ala Ala Glu Arg	
65 70 75 80	
cgc acc cag cgt gcc gcg acg agc cag ccc tcg cta gtc ctg gct gcc	288
Arg Thr Gln Arg Ala Ala Thr Ser Gln Pro Ser Leu Val Leu Ala Ala	
85 90 95	
aag gcc ggc gcc tcc ggt gag ctg ctg gcg aag ttg ctc gac gcg tac	336
Lys Ala Gly Ala Ser Gly Glu Leu Leu Ala Lys Leu Leu Asp Ala Tyr	
100 105 110	
gcc gcc gag ccg gga gcc gtg gcc gtc gac ctg ctg ctc tgc gaa tcc	384
Ala Ala Glu Pro Gly Ala Val Ala Val Asp Leu Leu Leu Cys Glu Ser	
115 120 125	
cag ccc cag aaa acg ctg cat gac ggc cgg gcc gac gtg gcg ctg ttg	432
Gln Pro Gln Lys Thr Leu His Asp Gly Arg Ala Asp Val Ala Leu Leu	
130 135 140	
cat caa ccc ttc gac ccg acg gcc gaa ctc gac atc gaa att ctg aac	480
His Gln Pro Phe Asp Pro Thr Ala Glu Leu Asp Ile Glu Ile Leu Asn	
145 150 155 160	
acc gag caa caa gtc gcc att ctt ccg acc tcg cat ccg ctt gcc agc	528
Thr Glu Gln Gln Val Ala Ile Leu Pro Thr Ser His Pro Leu Ala Ser	
165 170 175	
gag ccc cat gta cgg atg gcg gat gtc agc tca ctg ccg gat ctc ccg	576
Glu Pro His Val Arg Met Ala Asp Val Ser Ser Leu Pro Asp Leu Pro	
180 185 190	
ctt gcg cgc tgg ccc ggc ccc gac ggc gtc tat cca gat ggc ccc ggc	624
Leu Ala Arg Trp Pro Gly Pro Asp Gly Val Tyr Pro Asp Gly Pro Gly	
195 200 205	
gtg gaa gta cgc aac cag acg caa ctg ttc caa atg atc gca ctc ggc	672
Val Glu Val Arg Asn Gln Thr Gln Leu Phe Gln Met Ile Ala Leu Gly	
210 215 220	
cgc act acc gtg gtc atg ccc gaa tcc agt cgc gtc aac ctg ctc gaa	720
Arg Thr Thr Val Val Met Pro Glu Ser Ser Arg Val Asn Leu Leu Glu	
225 230 235 240	
ggc ctc gcc gcc gta ccg gtt cta gac gcg ccg gac gtg acg aca gtc	768

Gly	Leu	Ala	Ala	Val	Pro	Val	Leu	Asp	Ala	Pro	Asp	Val	Thr	Thr	Val		
				245					250					255			
atc	gcc	tgg	ccg	ccc	cac	agc	cgc	tcc	cga	gca	ctc	gcc	ggc	ttg	gtc	816	
Ile	Ala	Trp	Pro	Pro	His	Ser	Arg	Ser	Arg	Ala	Leu	Ala	Gly	Leu	Val		
			260					265					270				
cgc	gtg	gcc	aca	ctc	ctc	taa										837	
Arg	Val	Ala	Thr	Leu	Leu												
			275														

<210> 40
 <211> 278
 <212> PRT
 <213> Saccharopolyspora spinosa

<400> 40																	
Met	Glu	Thr	Arg	Glu	Leu	Arg	Tyr	Phe	Val	Ala	Val	Ala	Glu	Glu	Leu		
1				5					10					15			
His	Phe	Gly	Arg	Ala	Ala	Gln	Arg	Leu	Gly	Ile	Ala	Gln	Pro	Pro	Leu		
			20					25					30				
Ser	Arg	Thr	Ile	Ala	Gln	Leu	Glu	Gln	Arg	Leu	Gly	Val	Val	Leu	Leu		
		35					40					45					
Gln	Arg	Thr	Ser	Arg	Lys	Val	Ser	Leu	Thr	Glu	Ala	Gly	Ala	Met	Leu		
	50					55					60						
Leu	Thr	Glu	Gly	Arg	Ala	Ile	Leu	Gly	Ala	Leu	Ala	Ala	Ala	Glu	Arg		
65					70					75					80		
Arg	Thr	Gln	Arg	Ala	Ala	Thr	Ser	Gln	Pro	Ser	Leu	Val	Leu	Ala	Ala		
				85					90					95			
Lys	Ala	Gly	Ala	Ser	Gly	Glu	Leu	Leu	Ala	Lys	Leu	Leu	Asp	Ala	Tyr		
		100						105					110				
Ala	Ala	Glu	Pro	Gly	Ala	Val	Ala	Val	Asp	Leu	Leu	Leu	Cys	Glu	Ser		
		115					120					125					
Gln	Pro	Gln	Lys	Thr	Leu	His	Asp	Gly	Arg	Ala	Asp	Val	Ala	Leu	Leu		
	130					135					140						
His	Gln	Pro	Phe	Asp	Pro	Thr	Ala	Glu	Leu	Asp	Ile	Glu	Ile	Leu	Asn		
145					150					155					160		
Thr	Glu	Gln	Gln	Val	Ala	Ile	Leu	Pro	Thr	Ser	His	Pro	Leu	Ala	Ser		
				165					170					175			
Glu	Pro	His	Val	Arg	Met	Ala	Asp	Val	Ser	Ser	Leu	Pro	Asp	Leu	Pro		
			180					185					190				
Leu	Ala	Arg	Trp	Pro	Gly	Pro	Asp	Gly	Val	Tyr	Pro	Asp	Gly	Pro	Gly		
		195					200					205					

Val Glu Val Arg Asn Gln Thr Gln Leu Phe Gln Met Ile Ala Leu Gly
210 215 220

Arg Thr Thr Val Val Met Pro Glu Ser Ser Arg Val Asn Leu Leu Glu
225 230 235 240

Gly Leu Ala Ala Val Pro Val Leu Asp Ala Pro Asp Val Thr Thr Val
245 250 255

Ile Ala Trp Pro Pro His Ser Arg Ser Arg Ala Leu Ala Gly Leu Val
260 265 270

Arg Val Ala Thr Leu Leu
275

<210> 41
<211> 7788
<212> DNA
<213> Saccharopolyspora spinosa

<220>
<221> CDS
<222> (1)..(7785)
<223> ORF18; polyketide synthase

<400> 41
atg agc gaa gcc ggg aac ctg ata gcc gtc atc gga ctg tcc tgc cgc 48
Met Ser Glu Ala Gly Asn Leu Ile Ala Val Ile Gly Leu Ser Cys Arg
1 5 10 15

cta ccc cag gcg cct gac ccg gct tcc ttc tgg cgg ttg ctg cgc acc 96
Leu Pro Gln Ala Pro Asp Pro Ala Ser Phe Trp Arg Leu Leu Arg Thr
20 25 30

gga acg gac gcc atc acc acg gtc ccg gaa ggg cgg tgg ggc gac ccg 144
Gly Thr Asp Ala Ile Thr Thr Val Pro Glu Gly Arg Trp Gly Asp Pro
35 40 45

ttg cct ggt cgg gat gcg ccc aag ggc ccg gaa tgg ggt ggt ttc ctg 192
Leu Pro Gly Arg Asp Ala Pro Lys Gly Pro Glu Trp Gly Gly Phe Leu
50 55 60

gct gat gtc gac tgc ttc gat ccc gag ttc ttc ggg atc tcg ccg cga 240
Ala Asp Val Asp Cys Phe Asp Pro Glu Phe Phe Gly Ile Ser Pro Arg
65 70 75 80

gaa gcg gca gcc gtg gat ccc cag cag agg ctg gct ctg gag ctc gcc 288
Glu Ala Ala Ala Val Asp Pro Gln Gln Arg Leu Ala Leu Glu Leu Ala
85 90 95

tgg gag gca ctc gaa gac gcc ggt atc ccc gcc ggc gag ctg cgc ggt 336
Trp Glu Ala Leu Glu Asp Ala Gly Ile Pro Ala Gly Glu Leu Arg Gly
100 105 110

act gcc gcc ggt gtg ttc atg ggg gcg atc tct gac gac tac gcc gcc 384

Thr	Ala	Ala	Gly	Val	Phe	Met	Gly	Ala	Ile	Ser	Asp	Asp	Tyr	Ala	Ala		
		115					120					125					
ctg	ctg	cgc	gag	agc	ccg	ccg	gaa	gtg	gct	gcg	cag	tac	cgc	ctc	acc	432	
Leu	Leu	Arg	Glu	Ser	Pro	Pro	Glu	Val	Ala	Ala	Gln	Tyr	Arg	Leu	Thr		
		130				135					140						
ggc	acc	cat	cga	agc	ctg	atc	gcc	aac	cgc	gtg	tcc	tat	gtg	ctc	ggc	480	
Gly	Thr	His	Arg	Ser	Leu	Ile	Ala	Asn	Arg	Val	Ser	Tyr	Val	Leu	Gly		
145					150				155						160		
ctg	cgc	ggg	cca	agc	ctg	acg	gtg	gat	tca	ggg	cag	tcc	tcg	tcc	ctg	528	
Leu	Arg	Gly	Pro	Ser	Leu	Thr	Val	Asp	Ser	Gly	Gln	Ser	Ser	Ser	Leu		
				165				170						175			
gtc	ggc	gtg	cat	ctc	gcc	agc	gag	agc	ctg	cga	cgg	ggg	gag	tgc	acg	576	
Val	Gly	Val	His	Leu	Ala	Ser	Glu	Ser	Leu	Arg	Arg	Gly	Glu	Cys	Thr		
			180					185					190				
atc	gca	ctc	gcc	ggc	ggc	gtg	aac	ctc	aac	ctg	gcc	gcc	gag	agc	aac	624	
Ile	Ala	Leu	Ala	Gly	Gly	Val	Asn	Leu	Asn	Leu	Ala	Ala	Glu	Ser	Asn		
		195				200					205						
agc	gct	ctg	atg	gac	ttc	ggc	gcg	ctc	tcc	ccg	gac	ggg	cgc	tgc	ttc	672	
Ser	Ala	Leu	Met	Asp	Phe	Gly	Ala	Leu	Ser	Pro	Asp	Gly	Arg	Cys	Phe		
	210					215					220						
acc	ttc	gat	gtg	cgg	gcg	aac	ggg	tac	gtc	cgt	ggg	gag	ggc	ggc	ggc	720	
Thr	Phe	Asp	Val	Arg	Ala	Asn	Gly	Tyr	Val	Arg	Gly	Glu	Gly	Gly	Gly		
225					230					235					240		
ctt	gtc	gtg	ctg	aag	aag	gcc	gat	cag	gcg	cac	gcc	gat	ggc	gac	cgg	768	
Leu	Val	Val	Leu	Lys	Lys	Ala	Asp	Gln	Ala	His	Ala	Asp	Gly	Asp	Arg		
				245				250						255			
atc	tac	tgc	ctc	atc	cgc	ggc	agc	gcg	gtc	aac	aac	gat	ggg	ggc	ggg	816	
Ile	Tyr	Cys	Leu	Ile	Arg	Gly	Ser	Ala	Val	Asn	Asn	Asp	Gly	Gly	Gly		
			260					265					270				
gcc	ggg	ctc	acc	gtt	ccg	gcg	gcg	gac	gcc	cag	gcg	gag	ctg	ctg	cgc	864	
Ala	Gly	Leu	Thr	Val	Pro	Ala	Ala	Asp	Ala	Gln	Ala	Glu	Leu	Leu	Arg		
		275					280					285					
cag	gca	tac	cgg	aac	gcg	ggc	gtc	gac	ccg	gcc	gcc	gtg	cag	tat	gtc	912	
Gln	Ala	Tyr	Arg	Asn	Ala	Gly	Val	Asp	Pro	Ala	Ala	Val	Gln	Tyr	Val		
	290					295					300						
gag	ctc	cac	ggc	agc	gcg	acc	agg	gtc	ggg	gat	ccc	gtc	gaa	gca	gca	960	
Glu	Leu	His	Gly	Ser	Ala	Thr	Arg	Val	Gly	Asp	Pro	Val	Glu	Ala	Ala		
305					310					315					320		
gcc	ctc	gga	gct	gtc	ctg	ggg	gcg	gcg	aga	cgg	ccc	ggc	gac	gag	ctg	1008	
Ala	Leu	Gly	Ala	Val	Leu	Gly	Ala	Ala	Arg	Arg	Pro	Gly	Asp	Glu	Leu		
				325				330						335			
cgt	gtg	ggg	tcg	gcg	aag	acc	aac	gtc	ggc	cat	ctg	gaa	gca	gcg	gcg	1056	
Arg	Val	Gly	Ser	Ala	Lys	Thr	Asn	Val	Gly	His	Leu	Glu	Ala	Ala	Ala		

340						345						350						
ggc gtc acc ggg ttg ctg aag acc gca ctc agc atc tgg cac cgc gaa	1104																	
Gly Val Thr Gly Leu Leu Lys Thr Ala Leu Ser Ile Trp His Arg Glu																		
355 360 365																		
ctg ccg ccg agt ctt cat ttc acc gcc ccc aac ccg gaa atc ccg ctg	1152																	
Leu Pro Pro Ser Leu His Phe Thr Ala Pro Asn Pro Glu Ile Pro Leu																		
370 375 380																		
gac gaa ttg aac cta cgc gtc cag cgt gat ctg cgg ccg tgg ccg gag	1200																	
Asp Glu Leu Asn Leu Arg Val Gln Arg Asp Leu Arg Pro Trp Pro Glu																		
385 390 395 400																		
agc gag ggg ccg ctg ctg gcc ggc gtc agc gcc ttc gga atg gga ggc	1248																	
Ser Glu Gly Pro Leu Leu Ala Gly Val Ser Ala Phe Gly Met Gly Gly																		
405 410 415																		
acg aac tgc cac ctg gtg ctc tcc ggc acg tcc cgg gtg gag cga cgg	1296																	
Thr Asn Cys His Leu Val Leu Ser Gly Thr Ser Arg Val Glu Arg Arg																		
420 425 430																		
cgc agt gga ccc gct gag gcg acc atg ccg tgg gtc ttg tcg gcc aga	1344																	
Arg Ser Gly Pro Ala Glu Ala Thr Met Pro Trp Val Leu Ser Ala Arg																		
435 440 445																		
aca ccg gtc gca ttg cgt gcg cag gcg gcg cgc ttg cac acg cac ctc	1392																	
Thr Pro Val Ala Leu Arg Ala Gln Ala Ala Arg Leu His Thr His Leu																		
450 455 460																		
aat acg gcc ggt caa agt ccg ttg gac gtc gcc tac tca ctg gcg acc	1440																	
Asn Thr Ala Gly Gln Ser Pro Leu Asp Val Ala Tyr Ser Leu Ala Thr																		
465 470 475 480																		
act cga tcc gcg ctg ccg cac cgg gcc gcg ctg gtc gcg gac gac gaa	1488																	
Thr Arg Ser Ala Leu Pro His Arg Ala Ala Leu Val Ala Asp Asp Glu																		
485 490 495																		
ccg aaa ctg ctc gcc ggg ttg aag gcc ctc gct gac ggc gac gac gcg	1536																	
Pro Lys Leu Leu Ala Gly Leu Lys Ala Leu Ala Asp Gly Asp Asp Ala																		
500 505 510																		
ccc acg ctg tgc cac ggc gcg act tcc ggc gag cgg gca gcg gtc ttc	1584																	
Pro Thr Leu Cys His Gly Ala Thr Ser Gly Glu Arg Ala Ala Val Phe																		
515 520 525																		
gtc ttt ccc gga cag ggc agc cag tgg atc ggg atg ggt agg cag ctg	1632																	
Val Phe Pro Gly Gln Gly Ser Gln Trp Ile Gly Met Gly Arg Gln Leu																		
530 535 540																		
ctc gaa acc tcc gag gtt ttc gcg gcg tcg atg tcg gac tgc gcc gac	1680																	
Leu Glu Thr Ser Glu Val Phe Ala Ala Ser Met Ser Asp Cys Ala Asp																		
545 550 555 560																		
gca ttg gcg ccg cac ctg gat tgg tcc ctg ctg gat gtg ctg cgc aac	1728																	
Ala Leu Ala Pro His Leu Asp Trp Ser Leu Leu Asp Val Leu Arg Asn																		
565 570 575																		

gcg gcc ggc gct gcg cac ctt gac cac gac gat gtc gtc cag ccc gcg	1776
Ala Ala Gly Ala Ala His Leu Asp His Asp Asp Val Val Gln Pro Ala	
580 585 590	
ctg ttc gcc atc atg gtc tcg ctc gcg gag ctc tgg cgt tcg tgg ggc	1824
Leu Phe Ala Ile Met Val Ser Leu Ala Glu Leu Trp Arg Ser Trp Gly	
595 600 605	
gtg cgt ccg gtg gcg gtc gtc ggg cac tcg cag ggg gag atc gcg gcg	1872
Val Arg Pro Val Ala Val Val Gly His Ser Gln Gly Glu Ile Ala Ala	
610 615 620	
gcc tgc gtc gcc ggg gcc ctg tcc gtc cgc gat gcc gcc agg gtg gtg	1920
Ala Cys Val Ala Gly Ala Leu Ser Val Arg Asp Ala Ala Arg Val Val	
625 630 635 640	
gcg gtg cgc agc agg ctt ctg acg gcg ctg gcc ggc agt ggc gcg atg	1968
Ala Val Arg Ser Arg Leu Leu Thr Ala Leu Ala Gly Ser Gly Ala Met	
645 650 655	
gcc tcg ttg cag cat ccc gcc gaa gag gtg cgg caa atc ctg ttg ccc	2016
Ala Ser Leu Gln His Pro Ala Glu Glu Val Arg Gln Ile Leu Leu Pro	
660 665 670	
tgg cgc gat cgg atc ggc gtg gcg ggg gtg aac gga ccg tcg tcg acc	2064
Trp Arg Asp Arg Ile Gly Val Ala Gly Val Asn Gly Pro Ser Ser Thr	
675 680 685	
ctg gtg tca ggg gac cgg gag gcg atg gcg gaa ctg ctg gcc gag tgc	2112
Leu Val Ser Gly Asp Arg Glu Ala Met Ala Glu Leu Leu Ala Glu Cys	
690 695 700	
gca gac cga gag ctc cgg atg cgc cgg att ccc gtt gaa tac gcc tcc	2160
Ala Asp Arg Glu Leu Arg Met Arg Arg Ile Pro Val Glu Tyr Ala Ser	
705 710 715 720	
cat tcg cct cac atc gag gtt gtc cgg gat gag ctg ctg ggg ctg ttg	2208
His Ser Pro His Ile Glu Val Val Arg Asp Glu Leu Leu Gly Leu Leu	
725 730 735	
gcg ccg gtc gaa ccc agg acg gga agc atc ccg atc tat tcg acg acg	2256
Ala Pro Val Glu Pro Arg Thr Gly Ser Ile Pro Ile Tyr Ser Thr Thr	
740 745 750	
acc ggg gac ctg ctg gac cgg ccg atg gac gcc gac tac tgg tac cgc	2304
Thr Gly Asp Leu Leu Asp Arg Pro Met Asp Ala Asp Tyr Trp Tyr Arg	
755 760 765	
aac ctt cgt caa ccg gtg ctg ttc gaa gcg gcc gtc gag gcc ctg ttg	2352
Asn Leu Arg Gln Pro Val Leu Phe Glu Ala Ala Val Glu Ala Leu Leu	
770 775 780	
aag cgg ggg tac gac gca ttc atc gag atc agc cca cac ccg gtg ctg	2400
Lys Arg Gly Tyr Asp Ala Phe Ile Glu Ile Ser Pro His Pro Val Leu	
785 790 795 800	

act gcg aac atc cag gaa acc gcc gtg cga gca ggg cgg gag gta gtg	2448
Thr Ala Asn Ile Gln Glu Thr Ala Val Arg Ala Gly Arg Glu Val Val	
805 810 815	
gcg ctc ggg aca ctc cgc cgc ggc gaa ggt ggc atg cgg cag gcg ctg	2496
Ala Leu Gly Thr Leu Arg Arg Gly Glu Gly Gly Met Arg Gln Ala Leu	
820 825 830	
acg tcg ctg gcc aga gca cac gta cac gga gtg gcc gcg gac tgg cac	2544
Thr Ser Leu Ala Arg Ala His Val His Gly Val Ala Ala Asp Trp His	
835 840 845	
gcg gtc ttc gcc ggt acc ggg gcg cag cgg gtc gac ctg ccg acg tac	2592
Ala Val Phe Ala Gly Thr Gly Ala Gln Arg Val Asp Leu Pro Thr Tyr	
850 855 860	
gcc ttt cag cga cag cgc tac tgg ctg gac gcg aag ctt ccc gac gtc	2640
Ala Phe Gln Arg Gln Arg Tyr Trp Leu Asp Ala Lys Leu Pro Asp Val	
865 870 875 880	
gcc atg ccc gag agc gac gtg tcg acg gcg ttg cgg gaa aag ctg cgg	2688
Ala Met Pro Glu Ser Asp Val Ser Thr Ala Leu Arg Glu Lys Leu Arg	
885 890 895	
tct tcg ccg agg gcg gac gtg gac tcg acg acc ctc acg atg atc cgg	2736
Ser Ser Pro Arg Ala Asp Val Asp Ser Thr Thr Leu Thr Met Ile Arg	
900 905 910	
gca cag gca gcc gtg gtc ctc ggc cac tcc gat ccg aaa gag gtg gac	2784
Ala Gln Ala Ala Val Val Leu Gly His Ser Asp Pro Lys Glu Val Asp	
915 920 925	
ccg gat cgg acg ttc aag gac ctg ggc ttc gat tcc tcg atg gtg gtc	2832
Pro Asp Arg Thr Phe Lys Asp Leu Gly Phe Asp Ser Ser Met Val Val	
930 935 940	
gag ctg tgc gac cgc cta aac gcc gcc aca ggt ctg cga ctc gca ccg	2880
Glu Leu Cys Asp Arg Leu Asn Ala Ala Thr Gly Leu Arg Leu Ala Pro	
945 950 955 960	
agc gtc gtt ttc gac tgt cct acg ccg gac aag ctc gcc cgc cag gta	2928
Ser Val Val Phe Asp Cys Pro Thr Pro Asp Lys Leu Ala Arg Gln Val	
965 970 975	
cgg acg ttg ttg ttg ggc gag ccg gct ccc atg acg tca cac cgg ccg	2976
Arg Thr Leu Leu Leu Gly Glu Pro Ala Pro Met Thr Ser His Arg Pro	
980 985 990	
gac tcc gat gcg gac gag cct atc gcc gtg atc ggg atg ggc tgt cgg	3024
Asp Ser Asp Ala Asp Glu Pro Ile Ala Val Ile Gly Met Gly Cys Arg	
995 1000 1005	
ttt ccg ggt ggg gtg tcc tcg ccc gag gag ttg tgg cag ttg gtc gcc	3072
Phe Pro Gly Gly Val Ser Ser Pro Glu Glu Leu Trp Gln Leu Val Ala	
1010 1015 1020	
gct ggg cgg gac gtc gtg tcc gag ttc ccg gct gac cga ggt tgg gac	3120

Ala Gly Arg Asp Val Val Ser Glu Phe Pro Ala Asp Arg Gly Trp Asp	
1025 1030 1035 1040	
ctg gag cgt gcg ggg aca tcg cac gtg cgc gcc ggc ggg ttc ttg cat	3168
Leu Glu Arg Ala Gly Thr Ser His Val Arg Ala Gly Gly Phe Leu His	
1045 1050 1055	
ggc gcc ccg gat ttt gac ccc ggg ttc ttc cgg att tcg ccg cgc gag	3216
Gly Ala Pro Asp Phe Asp Pro Gly Phe Phe Arg Ile Ser Pro Arg Glu	
1060 1065 1070	
gcg ttg gcg atg gat cca cag cag cgg ttg ctg ctg gaa atc gcc tgg	3264
Ala Leu Ala Met Asp Pro Gln Gln Arg Leu Leu Leu Glu Ile Ala Trp	
1075 1080 1085	
gaa gca gtc gaa cga ggc ggg atc aac ccg cag cac ctg cac gga agt	3312
Glu Ala Val Glu Arg Gly Gly Ile Asn Pro Gln His Leu His Gly Ser	
1090 1095 1100	
caa acc ggg gtc ttc gtc ggc gcg acc tcc ctg gac tac ggg cca cgc	3360
Gln Thr Gly Val Phe Val Gly Ala Thr Ser Leu Asp Tyr Gly Pro Arg	
1105 1110 1115 1120	
ctg cac gaa gcg tcc gag gag gcg gcc ggg tac gtg ctc acc ggc agc	3408
Leu His Glu Ala Ser Glu Glu Ala Ala Gly Tyr Val Leu Thr Gly Ser	
1125 1130 1135	
acc acg agt gtg gcg tcg ggt cgg gtt gcg tat tcg ttc ggg ttc gag	3456
Thr Thr Ser Val Ala Ser Gly Arg Val Ala Tyr Ser Phe Gly Phe Glu	
1140 1145 1150	
ggc cct gcg gtg acg gtg gat acg gcg tgt tcg tcg tcg ttg gtg gcc	3504
Gly Pro Ala Val Thr Val Asp Thr Ala Cys Ser Ser Ser Leu Val Ala	
1155 1160 1165	
ctg cat ttg gcg tgt cag tcg ttg cgt tcg ggt gag tgt gat ctg gcg	3552
Leu His Leu Ala Cys Gln Ser Leu Arg Ser Gly Glu Cys Asp Leu Ala	
1170 1175 1180	
ttg gcc ggt ggt gtg acc gtg atg gcc acg ccg ggg atg ttc gtg gag	3600
Leu Ala Gly Gly Val Thr Val Met Ala Thr Pro Gly Met Phe Val Glu	
1185 1190 1195 1200	
ttt tcg cgg cag cgt ggt ttg gcg ccg gat ggg cgg tgc aag tcg ttc	3648
Phe Ser Arg Gln Arg Gly Leu Ala Pro Asp Gly Arg Cys Lys Ser Phe	
1205 1210 1215	
gcg gag gcc gcc gac ggc acc ggc tgg tcc gag ggt gct ggc ctg gtt	3696
Ala Glu Ala Ala Asp Gly Thr Gly Trp Ser Glu Gly Ala Gly Leu Val	
1220 1225 1230	
cta ctg gag cgg ttg tcg gat gcc cgg cgg aat ggg cat gag gtg ctg	3744
Leu Leu Glu Arg Leu Ser Asp Ala Arg Arg Asn Gly His Glu Val Leu	
1235 1240 1245	
gcg gtt gtt cgt ggt agt gcg gtg aat cag gac ggt gcg tcg aat ggt	3792
Ala Val Val Arg Gly Ser Ala Val Asn Gln Asp Gly Ala Ser Asn Gly	

1250	1255	1260	
ttg acc gcg ccg aat ggt tgc tgc cag cag cgg gtg att gcc cag gca			3840
Leu Thr Ala Pro Asn Gly Ser Ser Gln Gln Arg Val Ile Ala Gln Ala			
1265	1270	1275	1280
ttg gcg agt gcg ggg ttg tgc gtg tcc gat gtg gat gct gtg gag gcg			3888
Leu Ala Ser Ala Gly Leu Ser Val Ser Asp Val Asp Ala Val Glu Ala			
1285	1290	1295	
cat ggg acg ggc acg cgg ctt ggt gat ccg atc gag gcg cag gcg ctg			3936
His Gly Thr Gly Thr Arg Leu Gly Asp Pro Ile Glu Ala Gln Ala Leu			
1300	1305	1310	
atc gcc acc tac ggc cag ggc cgg ctt ccg gaa cgg cca ttg tgg ttg			3984
Ile Ala Thr Tyr Gly Gln Gly Arg Leu Pro Glu Arg Pro Leu Trp Leu			
1315	1320	1325	
ggc tgc atg aag tgc aac atc ggt cac gcg cag gca gct gcg ggg ata			4032
Gly Ser Met Lys Ser Asn Ile Gly His Ala Gln Ala Ala Ala Gly Ile			
1330	1335	1340	
gcc ggc gtc atg aag atg gtg atg gcg atg cgg cac ggg cag cta ccg			4080
Ala Gly Val Met Lys Met Val Met Ala Met Arg His Gly Gln Leu Pro			
1345	1350	1355	1360
cgc acg ttg cac gtg gat gag ccg act tct ggg gtg gat tgg tgc gcg			4128
Arg Thr Leu His Val Asp Glu Pro Thr Ser Gly Val Asp Trp Ser Ala			
1365	1370	1375	
ggg acg gtt caa ctc ctt acg gag aac acg ccc tgg ccc ggg agt ggt			4176
Gly Thr Val Gln Leu Leu Thr Glu Asn Thr Pro Trp Pro Gly Ser Gly			
1380	1385	1390	
cgt gtt cgt cgg gtg ggg gtg tgc tgc ttc ggg atc agt ggt act aac			4224
Arg Val Arg Arg Val Gly Val Ser Ser Phe Gly Ile Ser Gly Thr Asn			
1395	1400	1405	
gcg cac gtc atc ctc gaa cag ccc ccg gga gtg ccg agt cag tct gcg			4272
Ala His Val Ile Leu Glu Gln Pro Pro Gly Val Pro Ser Gln Ser Ala			
1410	1415	1420	
ggg ccg ggt tgc ggc tct gtc gtg gat gtt ccg gtg gtg ccg tgg atg			4320
Gly Pro Gly Ser Gly Ser Val Val Asp Val Pro Val Val Pro Trp Met			
1425	1430	1435	1440
gtg tgc ggc aaa aca ccc gaa gcg cta tcc gcg cag gca acg gcg ttg			4368
Val Ser Gly Lys Thr Pro Glu Ala Leu Ser Ala Gln Ala Thr Ala Leu			
1445	1450	1455	
atg acc tat ctg gac gag cga cct gat gtc tcc tgc ctg gat gtt ggg			4416
Met Thr Tyr Leu Asp Glu Arg Pro Asp Val Ser Ser Leu Asp Val Gly			
1460	1465	1470	
tac tgc ctg gcg ttg aca cgg tgc gcg ctg gat gag cga gcg gtg gtg			4464
Tyr Ser Leu Ala Leu Thr Arg Ser Ala Leu Asp Glu Arg Ala Val Val			
1475	1480	1485	

ctg ggg tcg gac cgt gaa acg ttg ttg tgc ggt gtg aaa gcg ctg tct Leu Gly Ser Asp Arg Glu Thr Leu Leu Cys Gly Val Lys Ala Leu Ser 1490 1495 1500	4512
gcc ggt cat gag gct tct ggg ttg gtg acc gga tct gtg ggg gct ggg Ala Gly His Glu Ala Ser Gly Leu Val Thr Gly Ser Val Gly Ala Gly 1505 1510 1515 1520	4560
ggc cgc atc ggg ttt gtg ttt tcc ggt cag ggt ggt cag tgg ctg ggg Gly Arg Ile Gly Phe Val Phe Ser Gly Gln Gly Gly Gln Trp Leu Gly 1525 1530 1535	4608
atg ggc cgg ggg ctt tac cgg gct ttt ccg gtg ttc gct gct gcc ttt Met Gly Arg Gly Leu Tyr Arg Ala Phe Pro Val Phe Ala Ala Ala Phe 1540 1545 1550	4656
gac gaa gct tgt gcc gag ctg gat gcg cat ctg ggc cag gaa atc ggg Asp Glu Ala Cys Ala Glu Leu Asp Ala His Leu Gly Gln Glu Ile Gly 1555 1560 1565	4704
gtt cgg gag gtg gtg tcc ggt tcg gat gcg cag ttg ctg gat cgg acg Val Arg Glu Val Val Ser Gly Ser Asp Ala Gln Leu Leu Asp Arg Thr 1570 1575 1580	4752
ttg tgg gcg cag tcg ggt ttg ttc gcg ttg cag gtg ggc ttg ctg aag Leu Trp Ala Gln Ser Gly Leu Phe Ala Leu Gln Val Gly Leu Leu Lys 1585 1590 1595 1600	4800
ttg ctg gat tcg tgg ggg gtt cgg ccg agt gtg gtg ttg ggg cat tcg Leu Leu Asp Ser Trp Gly Val Arg Pro Ser Val Val Leu Gly His Ser 1605 1610 1615	4848
gtg ggc gag ttg gcg gcg gcg ttc gcg gcg ggt gtg gtg tcg ttg tcg Val Gly Glu Leu Ala Ala Ala Phe Ala Ala Gly Val Val Ser Leu Ser 1620 1625 1630	4896
ggg gcg gct cgg ttg gtg gcg ggt cgt gcc cgg ttg atg cag gcg ttg Gly Ala Ala Arg Leu Val Ala Gly Arg Ala Arg Leu Met Gln Ala Leu 1635 1640 1645	4944
ccg tct ggc ggt ggg atg ctg gcg gtg cct gct ggt gag gag ctg ttg Pro Ser Gly Gly Gly Met Leu Ala Val Pro Ala Gly Glu Glu Leu Leu 1650 1655 1660	4992
tgg tcg ttg ttg gcc gat cag ggt gat cgt gtg ggg atc gcc gcg gtc Trp Ser Leu Leu Ala Asp Gln Gly Asp Arg Val Gly Ile Ala Ala Val 1665 1670 1675 1680	5040
aac gct gcg ggg tcg gtg gtg ctc tct ggt gat cgg gat gtg ctc gat Asn Ala Ala Gly Ser Val Val Leu Ser Gly Asp Arg Asp Val Leu Asp 1685 1690 1695	5088
gac ctt gcc ggt cgg ctg gac ggg caa ggg atc cgg tcg agg tgg ttg Asp Leu Ala Gly Arg Leu Asp Gly Gln Gly Ile Arg Ser Arg Trp Leu 1700 1705 1710	5136

cgg gtg tcg cat gcg ttt cat tcg tat cgg atg gat ccg atg ctg gcg Arg Val Ser His Ala Phe His Ser Tyr Arg Met Asp Pro Met Leu Ala 1715 1720 1725	5184
gag ttc gcc gaa ttg gca cga acc gtg gat tac cgg cgt tgt gaa gtg Glu Phe Ala Glu Leu Ala Arg Thr Val Asp Tyr Arg Arg Cys Glu Val 1730 1735 1740	5232
ccg atc gtg tcg acc ttg acc gga gac ctc gat gac gct ggc agg atg Pro Ile Val Ser Thr Leu Thr Gly Asp Leu Asp Asp Ala Gly Arg Met 1745 1750 1755 1760	5280
agc ggg ccc gac tac tgg gtg cgt cag gtg cga gag ccg gtc cgc ttc Ser Gly Pro Asp Tyr Trp Val Arg Gln Val Arg Glu Pro Val Arg Phe 1765 1770 1775	5328
gcc gac ggt gtc cag gcg ctg gtc gag cac gat gtg gcc acc gtt gtc Ala Asp Gly Val Gln Ala Leu Val Glu His Asp Val Ala Thr Val Val 1780 1785 1790	5376
gag ctc ggt ccg gac ggg gcg ttg tcg gcg ctg atc cag gaa tgt gtc Glu Leu Gly Pro Asp Gly Ala Leu Ser Ala Leu Ile Gln Glu Cys Val 1795 1800 1805	5424
gcc gca tcc gat cac gcc ggg cgg ctg agc gcg gtc ccg gcg atg cgc Ala Ala Ser Asp His Ala Gly Arg Leu Ser Ala Val Pro Ala Met Arg 1810 1815 1820	5472
agg aac cag gac gag gcg cag aag gtg atg acg gcc ctg gca cac gtc Arg Asn Gln Asp Glu Ala Gln Lys Val Met Thr Ala Leu Ala His Val 1825 1830 1835 1840	5520
cac gta cgt ggt ggt gcg gtg gac tgg cgg tcg ttc ttc gcc ggt aca His Val Arg Gly Gly Ala Val Asp Trp Arg Ser Phe Phe Ala Gly Thr 1845 1850 1855	5568
agg gcg aag caa atc gag ctg ccc acc tac gcc ttc caa cga cag cgg Arg Ala Lys Gln Ile Glu Leu Pro Thr Tyr Ala Phe Gln Arg Gln Arg 1860 1865 1870	5616
tac tgg ctg aac gcg ctg cgt gaa tct tcc gcc ggc gac atg ggc agg Tyr Trp Leu Asn Ala Leu Arg Glu Ser Ser Ala Gly Asp Met Gly Arg 1875 1880 1885	5664
cgt gtc gaa gcg aag ttc tgg ggc gcc gtc gag cac gaa gat gtg gaa Arg Val Glu Ala Lys Phe Trp Gly Ala Val Glu His Glu Asp Val Glu 1890 1895 1900	5712
tcg ctt gca cgc gta ttg ggc att gtg gac gac ggc gct gct gtg gat Ser Leu Ala Arg Val Leu Gly Ile Val Asp Asp Gly Ala Ala Val Asp 1905 1910 1915 1920	5760
tcc ctg aga agc gcc ctt ccg gtg ttg gcc ggt tgg cag cga acc cgc Ser Leu Arg Ser Ala Leu Pro Val Leu Ala Gly Trp Gln Arg Thr Arg 1925 1930 1935	5808
acc acc gag tcc att atg gat cag cgg tgt tac cga att ggc tgg cgg 	5856

Thr Thr Glu Ser Ile Met Asp Gln Arg Cys Tyr Arg Ile Gly Trp Arg	
1940 1945 1950	
cag gta gcc gga ctc ccg ccg atg gga act gtt ttc ggt acc tgg ctg	5904
Gln Val Ala Gly Leu Pro Pro Met Gly Thr Val Phe Gly Thr Trp Leu	
1955 1960 1965	
gtc ttc gcg cct cat ggc tgg tcc agc gaa ccg gag gtg gtg gac tgc	5952
Val Phe Ala Pro His Gly Trp Ser Ser Glu Pro Glu Val Val Asp Cys	
1970 1975 1980	
gtt acg gca ctg cgg gca cgt ggt gcc tcg gtg gtg ttg gtg gaa gct	6000
Val Thr Ala Leu Arg Ala Arg Gly Ala Ser Val Val Leu Val Glu Ala	
1985 1990 1995 2000	
gat ccc gac ccg acc tcc ttc ggc gac ccg gta cga acc ctg tgt tcg	6048
Asp Pro Asp Pro Thr Ser Phe Gly Asp Arg Val Arg Thr Leu Cys Ser	
2005 2010 2015	
ggc ctt ccg gat ctt gtt ggc gtg ttg tca atg ttg tgc ttg gaa gaa	6096
Gly Leu Pro Asp Leu Val Gly Val Leu Ser Met Leu Cys Leu Glu Glu	
2020 2025 2030	
tcg gtc ctt ccg gga ttt tct gcg gtg tca ccg ggt ttt gcg ttg acc	6144
Ser Val Leu Pro Gly Phe Ser Ala Val Ser Arg Gly Phe Ala Leu Thr	
2035 2040 2045	
gtg gag ttg gtg cgg gtt ttg cgg gca gct ggt gcg act gcc ccg ttg	6192
Val Glu Leu Val Arg Val Leu Arg Ala Ala Gly Ala Thr Ala Arg Leu	
2050 2055 2060	
tgg ttg ctg acg tgt ggt ggc gtg tcg gtg gga gat gta ccg gtt cgt	6240
Trp Leu Leu Thr Cys Gly Gly Val Ser Val Gly Asp Val Pro Val Arg	
2065 2070 2075 2080	
cca gcg cag gcc ctg gcg tgg ggg ttg ggg cgt gtt gtg ggg ttg gag	6288
Pro Ala Gln Ala Leu Ala Trp Gly Leu Gly Arg Val Val Gly Leu Glu	
2085 2090 2095	
cat ccg gac tgg tgg ggc ggc ttg atc gat att ccg gtc ttg ttc gac	6336
His Pro Asp Trp Trp Gly Gly Leu Ile Asp Ile Pro Val Leu Phe Asp	
2100 2105 2110	
gaa gac gct caa gag cgg ttg tcg att gtg ctg gca ggt ctc gat gag	6384
Glu Asp Ala Gln Glu Arg Leu Ser Ile Val Leu Ala Gly Leu Asp Glu	
2115 2120 2125	
gac gag gtc gcg atc cgt cct gac ggc atg ttc gcg cgt ccg ttg gta	6432
Asp Glu Val Ala Ile Arg Pro Asp Gly Met Phe Ala Arg Arg Leu Val	
2130 2135 2140	
cgc cac act gtc tca gct gat gtg aag aag gcg tgg cgc ccc agg gga	6480
Arg His Thr Val Ser Ala Asp Val Lys Lys Ala Trp Arg Pro Arg Gly	
2145 2150 2155 2160	
tcg gtg ctg gtg acg ggc ggc acg ggt ggt ttg ggg gcg cac gtt gct	6528
Ser Val Leu Val Thr Gly Gly Thr Gly Gly Leu Gly Ala His Val Ala	

2165	2170	2175	
cgc tgg ctg gcc gac gcc gga gcc gaa cat gtg gcg atg gtg agt cga			6576
Arg Trp Leu Ala Asp Ala Gly Ala Glu His Val Ala Met Val Ser Arg			
2180	2185	2190	
cgc ggc gag cag gca ccg agt gct gag aag ttg cgg acg gaa ctg gag			6624
Arg Gly Glu Gln Ala Pro Ser Ala Glu Lys Leu Arg Thr Glu Leu Glu			
2195	2200	2205	
gat ctg ggt acc cgg gtg tcg atc gtg tca tgc gat gtg acc gat cgc			6672
Asp Leu Gly Thr Arg Val Ser Ile Val Ser Cys Asp Val Thr Asp Arg			
2210	2215	2220	
gag gcg ctc gcc gaa gtg ctg aaa gcc ctt ccg gct gaa aac ccg ttg			6720
Glu Ala Leu Ala Glu Val Leu Lys Ala Leu Pro Ala Glu Asn Pro Leu			
2225	2230	2235	2240
acc gcg gta gtg cat gcg gca ggc gtg atc gag act ggt gat gcg gcg			6768
Thr Ala Val Val His Ala Ala Gly Val Ile Glu Thr Gly Asp Ala Ala			
2245	2250	2255	
gca atg agc ctg gct gat ttc gat cac gtg ttg tcc gca aag gtg gcc			6816
Ala Met Ser Leu Ala Asp Phe Asp His Val Leu Ser Ala Lys Val Ala			
2260	2265	2270	
ggt gcc gcg aat ctg gat gcc ttg ttg gcc gat gtg gaa ttg gac gcg			6864
Gly Ala Ala Asn Leu Asp Ala Leu Leu Ala Asp Val Glu Leu Asp Ala			
2275	2280	2285	
ttc gtc ttg ttc tca tcg gtg tca gga gtt tgg ggc gct ggg gga cac			6912
Phe Val Leu Phe Ser Ser Val Ser Gly Val Trp Gly Ala Gly Gly His			
2290	2295	2300	
ggg gct tac gca gcg gcg aat gcc tat ctg gat gcg ctc gcg gaa cag			6960
Gly Ala Tyr Ala Ala Ala Asn Ala Tyr Leu Asp Ala Leu Ala Glu Gln			
2305	2310	2315	2320
cgt cgg tcg cga ggg ctg gtc gcg act gcg gtg gcc tgg ggg ccg tgg			7008
Arg Arg Ser Arg Gly Leu Val Ala Thr Ala Val Ala Trp Gly Pro Trp			
2325	2330	2335	
gcc ggc gag ggc atg gcc tcc gga gaa aca gga gac cag ctg cgc cga			7056
Ala Gly Glu Gly Met Ala Ser Gly Glu Thr Gly Asp Gln Leu Arg Arg			
2340	2345	2350	
tac ggc ctt tcc cca atg gct ccg cag cac gcc atc gcc gga atc ccg			7104
Tyr Gly Leu Ser Pro Met Ala Pro Gln His Ala Ile Ala Gly Ile Arg			
2355	2360	2365	
cag gcc gtg gaa cag gac gaa att tcc ctg gta gtg gcc gat gtc gat			7152
Gln Ala Val Glu Gln Asp Glu Ile Ser Leu Val Val Ala Asp Val Asp			
2370	2375	2380	
tgg gca cgt ttc agc gcg gga ttg ctg gcg gct agg ccg cgg ccg ctg			7200
Trp Ala Arg Phe Ser Ala Gly Leu Leu Ala Ala Arg Pro Arg Pro Leu			
2385	2390	2395	2400

ctg aac gaa ctg gcc gag gtc aag gaa ctc ctc gtc gat gcc cag ccc Leu Asn Glu Leu Ala Glu Val Lys Glu Leu Leu Val Asp Ala Gln Pro 2405 2410 2415	7248
gag gcg gga gtc ctt gcc gac gcg tcg ttg gaa tgg cgg cag cga ttg Glu Ala Gly Val Leu Ala Asp Ala Ser Leu Glu Trp Arg Gln Arg Leu 2420 2425 2430	7296
tcc gcg gca ccg agg ccg aca cag gaa cag ctg atc ctg gag ctg gta Ser Ala Ala Pro Arg Pro Thr Gln Glu Gln Leu Ile Leu Glu Leu Val 2435 2440 2445	7344
cgc ggc gaa acc gct ctg gtg ctg gga cac ccc ggg gca gcg gcc gtt Arg Gly Glu Thr Ala Leu Val Leu Gly His Pro Gly Ala Ala Ala Val 2450 2455 2460	7392
gca tcg gaa cga gcc ttc aag gac agc gga ttc gac tcg cag gcc gcg Ala Ser Glu Arg Ala Phe Lys Asp Ser Gly Phe Asp Ser Gln Ala Ala 2465 2470 2475 2480	7440
gtc gaa ctc cgc gtt cgg ctc aat cga gct acc ggc ctc cag ttg cca Val Glu Leu Arg Val Arg Leu Asn Arg Ala Thr Gly Leu Gln Leu Pro 2485 2490 2495	7488
tcg aca att atc ttc agc cat ccc acg cct gcg gaa ctg gct gcg gag Ser Thr Ile Ile Phe Ser His Pro Thr Pro Ala Glu Leu Ala Ala Glu 2500 2505 2510	7536
ctg cgg gcg agg ctt ctt ccc gag tcc gca gga gca ggc att ccc gag Leu Arg Ala Arg Leu Leu Pro Glu Ser Ala Gly Ala Gly Ile Pro Glu 2515 2520 2525	7584
gag gac gag gcg cga atc aga gcg gca ctg acg tcg atc ccg ttc ccg Glu Asp Glu Ala Arg Ile Arg Ala Ala Leu Thr Ser Ile Pro Phe Pro 2530 2535 2540	7632
gcc ttg cgc gag gca ggc ttg gtg agt ccg ctg ctc gca ctt gcc gga Ala Leu Arg Glu Ala Gly Leu Val Ser Pro Leu Leu Ala Leu Ala Gly 2545 2550 2555 2560	7680
cac ccg gtc gac tcc ggt atc tcc tcg gac gat gcg gcc gcg acc tcg His Pro Val Asp Ser Gly Ile Ser Ser Asp Asp Ala Ala Ala Thr Ser 2565 2570 2575	7728
atc gat gcg atg gat gta gcc ggc ctc gtc gaa gca gcg ctg ggc gaa Ile Asp Ala Met Asp Val Ala Gly Leu Val Glu Ala Ala Leu Gly Glu 2580 2585 2590	7776
cgc gag tcc tga Arg Glu Ser 2595	7788

<210> 42

<211> 2595

<212> PRT

<213> Saccharopolyspora spinosa

<400> 42

Met	Ser	Glu	Ala	Gly	Asn	Leu	Ile	Ala	Val	Ile	Gly	Leu	Ser	Cys	Arg
1				5					10					15	
Leu	Pro	Gln	Ala	Pro	Asp	Pro	Ala	Ser	Phe	Trp	Arg	Leu	Leu	Arg	Thr
			20					25					30		
Gly	Thr	Asp	Ala	Ile	Thr	Thr	Val	Pro	Glu	Gly	Arg	Trp	Gly	Asp	Pro
		35					40					45			
Leu	Pro	Gly	Arg	Asp	Ala	Pro	Lys	Gly	Pro	Glu	Trp	Gly	Gly	Phe	Leu
		50					55				60				
Ala	Asp	Val	Asp	Cys	Phe	Asp	Pro	Glu	Phe	Phe	Gly	Ile	Ser	Pro	Arg
65					70					75					80
Glu	Ala	Ala	Ala	Val	Asp	Pro	Gln	Gln	Arg	Leu	Ala	Leu	Glu	Leu	Ala
				85					90					95	
Trp	Glu	Ala	Leu	Glu	Asp	Ala	Gly	Ile	Pro	Ala	Gly	Glu	Leu	Arg	Gly
			100					105						110	
Thr	Ala	Ala	Gly	Val	Phe	Met	Gly	Ala	Ile	Ser	Asp	Asp	Tyr	Ala	Ala
			115				120					125			
Leu	Leu	Arg	Glu	Ser	Pro	Pro	Glu	Val	Ala	Ala	Gln	Tyr	Arg	Leu	Thr
		130					135					140			
Gly	Thr	His	Arg	Ser	Leu	Ile	Ala	Asn	Arg	Val	Ser	Tyr	Val	Leu	Gly
145					150					155					160
Leu	Arg	Gly	Pro	Ser	Leu	Thr	Val	Asp	Ser	Gly	Gln	Ser	Ser	Ser	Leu
				165					170					175	
Val	Gly	Val	His	Leu	Ala	Ser	Glu	Ser	Leu	Arg	Arg	Gly	Glu	Cys	Thr
			180						185					190	
Ile	Ala	Leu	Ala	Gly	Gly	Val	Asn	Leu	Asn	Leu	Ala	Ala	Glu	Ser	Asn
		195					200					205			
Ser	Ala	Leu	Met	Asp	Phe	Gly	Ala	Leu	Ser	Pro	Asp	Gly	Arg	Cys	Phe
		210				215					220				
Thr	Phe	Asp	Val	Arg	Ala	Asn	Gly	Tyr	Val	Arg	Gly	Glu	Gly	Gly	Gly
225					230					235					240
Leu	Val	Val	Leu	Lys	Lys	Ala	Asp	Gln	Ala	His	Ala	Asp	Gly	Asp	Arg
				245					250					255	
Ile	Tyr	Cys	Leu	Ile	Arg	Gly	Ser	Ala	Val	Asn	Asn	Asp	Gly	Gly	Gly
			260					265					270		
Ala	Gly	Leu	Thr	Val	Pro	Ala	Ala	Asp	Ala	Gln	Ala	Glu	Leu	Leu	Arg
		275					280					285			

Gln	Ala	Tyr	Arg	Asn	Ala	Gly	Val	Asp	Pro	Ala	Ala	Val	Gln	Tyr	Val	290	295	300	
Glu	Leu	His	Gly	Ser	Ala	Thr	Arg	Val	Gly	Asp	Pro	Val	Glu	Ala	Ala	305	310	315	320
Ala	Leu	Gly	Ala	Val	Leu	Gly	Ala	Ala	Arg	Arg	Pro	Gly	Asp	Glu	Leu	325	330	335	
Arg	Val	Gly	Ser	Ala	Lys	Thr	Asn	Val	Gly	His	Leu	Glu	Ala	Ala	Ala	340	345	350	
Gly	Val	Thr	Gly	Leu	Leu	Lys	Thr	Ala	Leu	Ser	Ile	Trp	His	Arg	Glu	355	360	365	
Leu	Pro	Pro	Ser	Leu	His	Phe	Thr	Ala	Pro	Asn	Pro	Glu	Ile	Pro	Leu	370	375	380	
Asp	Glu	Leu	Asn	Leu	Arg	Val	Gln	Arg	Asp	Leu	Arg	Pro	Trp	Pro	Glu	385	390	395	400
Ser	Glu	Gly	Pro	Leu	Leu	Ala	Gly	Val	Ser	Ala	Phe	Gly	Met	Gly	Gly	405	410	415	
Thr	Asn	Cys	His	Leu	Val	Leu	Ser	Gly	Thr	Ser	Arg	Val	Glu	Arg	Arg	420	425	430	
Arg	Ser	Gly	Pro	Ala	Glu	Ala	Thr	Met	Pro	Trp	Val	Leu	Ser	Ala	Arg	435	440	445	
Thr	Pro	Val	Ala	Leu	Arg	Ala	Gln	Ala	Ala	Arg	Leu	His	Thr	His	Leu	450	455	460	
Asn	Thr	Ala	Gly	Gln	Ser	Pro	Leu	Asp	Val	Ala	Tyr	Ser	Leu	Ala	Thr	465	470	475	480
Thr	Arg	Ser	Ala	Leu	Pro	His	Arg	Ala	Ala	Leu	Val	Ala	Asp	Asp	Glu	485	490	495	
Pro	Lys	Leu	Leu	Ala	Gly	Leu	Lys	Ala	Leu	Ala	Asp	Gly	Asp	Asp	Ala	500	505	510	
Pro	Thr	Leu	Cys	His	Gly	Ala	Thr	Ser	Gly	Glu	Arg	Ala	Ala	Val	Phe	515	520	525	
Val	Phe	Pro	Gly	Gln	Gly	Ser	Gln	Trp	Ile	Gly	Met	Gly	Arg	Gln	Leu	530	535	540	
Leu	Glu	Thr	Ser	Glu	Val	Phe	Ala	Ala	Ser	Met	Ser	Asp	Cys	Ala	Asp	545	550	555	560
Ala	Leu	Ala	Pro	His	Leu	Asp	Trp	Ser	Leu	Leu	Asp	Val	Leu	Arg	Asn	565	570	575	
Ala	Ala	Gly	Ala	Ala	His	Leu	Asp	His	Asp	Asp	Val	Val	Gln	Pro	Ala	580	585	590	

Leu	Phe	Ala	Ile	Met	Val	Ser	Leu	Ala	Glu	Leu	Trp	Arg	Ser	Trp	Gly	595	600	605
Val	Arg	Pro	Val	Ala	Val	Val	Gly	His	Ser	Gln	Gly	Glu	Ile	Ala	Ala	610	615	620
Ala	Cys	Val	Ala	Gly	Ala	Leu	Ser	Val	Arg	Asp	Ala	Ala	Arg	Val	Val	625	630	635
Ala	Val	Arg	Ser	Arg	Leu	Leu	Thr	Ala	Leu	Ala	Gly	Ser	Gly	Ala	Met	645	650	655
Ala	Ser	Leu	Gln	His	Pro	Ala	Glu	Glu	Val	Arg	Gln	Ile	Leu	Leu	Pro	660	665	670
Trp	Arg	Asp	Arg	Ile	Gly	Val	Ala	Gly	Val	Asn	Gly	Pro	Ser	Ser	Thr	675	680	685
Leu	Val	Ser	Gly	Asp	Arg	Glu	Ala	Met	Ala	Glu	Leu	Leu	Ala	Glu	Cys	690	695	700
Ala	Asp	Arg	Glu	Leu	Arg	Met	Arg	Arg	Ile	Pro	Val	Glu	Tyr	Ala	Ser	705	710	715
His	Ser	Pro	His	Ile	Glu	Val	Val	Arg	Asp	Glu	Leu	Leu	Gly	Leu	Leu	725	730	735
Ala	Pro	Val	Glu	Pro	Arg	Thr	Gly	Ser	Ile	Pro	Ile	Tyr	Ser	Thr	Thr	740	745	750
Thr	Gly	Asp	Leu	Leu	Asp	Arg	Pro	Met	Asp	Ala	Asp	Tyr	Trp	Tyr	Arg	755	760	765
Asn	Leu	Arg	Gln	Pro	Val	Leu	Phe	Glu	Ala	Ala	Val	Glu	Ala	Leu	Leu	770	775	780
Lys	Arg	Gly	Tyr	Asp	Ala	Phe	Ile	Glu	Ile	Ser	Pro	His	Pro	Val	Leu	785	790	795
Thr	Ala	Asn	Ile	Gln	Glu	Thr	Ala	Val	Arg	Ala	Gly	Arg	Glu	Val	Val	805	810	815
Ala	Leu	Gly	Thr	Leu	Arg	Arg	Gly	Glu	Gly	Gly	Met	Arg	Gln	Ala	Leu	820	825	830
Thr	Ser	Leu	Ala	Arg	Ala	His	Val	His	Gly	Val	Ala	Ala	Asp	Trp	His	835	840	845
Ala	Val	Phe	Ala	Gly	Thr	Gly	Ala	Gln	Arg	Val	Asp	Leu	Pro	Thr	Tyr	850	855	860
Ala	Phe	Gln	Arg	Gln	Arg	Tyr	Trp	Leu	Asp	Ala	Lys	Leu	Pro	Asp	Val	865	870	875
Ala	Met	Pro	Glu	Ser	Asp	Val	Ser	Thr	Ala	Leu	Arg	Glu	Lys	Leu	Arg	885	890	895

Ser	Ser	Pro	Arg	Ala	Asp	Val	Asp	Ser	Thr	Thr	Leu	Thr	Met	Ile	Arg			
			900					905					910					
Ala	Gln	Ala	Ala	Val	Val	Leu	Gly	His	Ser	Asp	Pro	Lys	Glu	Val	Asp			
		915					920					925						
Pro	Asp	Arg	Thr	Phe	Lys	Asp	Leu	Gly	Phe	Asp	Ser	Ser	Met	Val	Val			
	930					935					940							
Glu	Leu	Cys	Asp	Arg	Leu	Asn	Ala	Ala	Thr	Gly	Leu	Arg	Leu	Ala	Pro			
945					950					955					960			
Ser	Val	Val	Phe	Asp	Cys	Pro	Thr	Pro	Asp	Lys	Leu	Ala	Arg	Gln	Val			
				965					970					975				
Arg	Thr	Leu	Leu	Leu	Gly	Glu	Pro	Ala	Pro	Met	Thr	Ser	His	Arg	Pro			
			980					985					990					
Asp	Ser	Asp	Ala	Asp	Glu	Pro	Ile	Ala	Val	Ile	Gly	Met	Gly	Cys	Arg			
		995				1000						1005						
Phe	Pro	Gly	Gly	Val	Ser	Ser	Pro	Glu	Glu	Leu	Trp	Gln	Leu	Val	Ala			
	1010					1015				1020								
Ala	Gly	Arg	Asp	Val	Val	Ser	Glu	Phe	Pro	Ala	Asp	Arg	Gly	Trp	Asp			
1025				1030				1035						1040				
Leu	Glu	Arg	Ala	Gly	Thr	Ser	His	Val	Arg	Ala	Gly	Gly	Phe	Leu	His			
			1045				1050						1055					
Gly	Ala	Pro	Asp	Phe	Asp	Pro	Gly	Phe	Phe	Arg	Ile	Ser	Pro	Arg	Glu			
		1060					1065					1070						
Ala	Leu	Ala	Met	Asp	Pro	Gln	Gln	Arg	Leu	Leu	Leu	Glu	Ile	Ala	Trp			
	1075					1080						1085						
Glu	Ala	Val	Glu	Arg	Gly	Gly	Ile	Asn	Pro	Gln	His	Leu	His	Gly	Ser			
1090					1095					1100								
Gln	Thr	Gly	Val	Phe	Val	Gly	Ala	Thr	Ser	Leu	Asp	Tyr	Gly	Pro	Arg			
1105				1110					1115					1120				
Leu	His	Glu	Ala	Ser	Glu	Glu	Ala	Ala	Gly	Tyr	Val	Leu	Thr	Gly	Ser			
			1125				1130					1135						
Thr	Thr	Ser	Val	Ala	Ser	Gly	Arg	Val	Ala	Tyr	Ser	Phe	Gly	Phe	Glu			
		1140					1145					1150						
Gly	Pro	Ala	Val	Thr	Val	Asp	Thr	Ala	Cys	Ser	Ser	Ser	Leu	Val	Ala			
	1155					1160					1165							
Leu	His	Leu	Ala	Cys	Gln	Ser	Leu	Arg	Ser	Gly	Glu	Cys	Asp	Leu	Ala			
	1170				1175					1180								
Leu	Ala	Gly	Gly	Val	Thr	Val	Met	Ala	Thr	Pro	Gly	Met	Phe	Val	Glu			
1185				1190					1195					1200				

Phe	Ser	Arg	Gln	Arg	Gly	Leu	Ala	Pro	Asp	Gly	Arg	Cys	Lys	Ser	Phe	1205	1210	1215	
Ala	Glu	Ala	Ala	Asp	Gly	Thr	Gly	Trp	Ser	Glu	Gly	Ala	Gly	Leu	Val	1220	1225	1230	
Leu	Leu	Glu	Arg	Leu	Ser	Asp	Ala	Arg	Arg	Asn	Gly	His	Glu	Val	Leu	1235	1240	1245	
Ala	Val	Val	Arg	Gly	Ser	Ala	Val	Asn	Gln	Asp	Gly	Ala	Ser	Asn	Gly	1250	1255	1260	
Leu	Thr	Ala	Pro	Asn	Gly	Ser	Ser	Gln	Gln	Arg	Val	Ile	Ala	Gln	Ala	1265	1270	1275	1280
Leu	Ala	Ser	Ala	Gly	Leu	Ser	Val	Ser	Asp	Val	Asp	Ala	Val	Glu	Ala	1285	1290	1295	
His	Gly	Thr	Gly	Thr	Arg	Leu	Gly	Asp	Pro	Ile	Glu	Ala	Gln	Ala	Leu	1300	1305	1310	
Ile	Ala	Thr	Tyr	Gly	Gln	Gly	Arg	Leu	Pro	Glu	Arg	Pro	Leu	Trp	Leu	1315	1320	1325	
Gly	Ser	Met	Lys	Ser	Asn	Ile	Gly	His	Ala	Gln	Ala	Ala	Ala	Gly	Ile	1330	1335	1340	
Ala	Gly	Val	Met	Lys	Met	Val	Met	Ala	Met	Arg	His	Gly	Gln	Leu	Pro	1345	1350	1355	1360
Arg	Thr	Leu	His	Val	Asp	Glu	Pro	Thr	Ser	Gly	Val	Asp	Trp	Ser	Ala	1365	1370	1375	
Gly	Thr	Val	Gln	Leu	Leu	Thr	Glu	Asn	Thr	Pro	Trp	Pro	Gly	Ser	Gly	1380	1385	1390	
Arg	Val	Arg	Arg	Val	Gly	Val	Ser	Ser	Phe	Gly	Ile	Ser	Gly	Thr	Asn	1395	1400	1405	
Ala	His	Val	Ile	Leu	Glu	Gln	Pro	Pro	Gly	Val	Pro	Ser	Gln	Ser	Ala	1410	1415	1420	
Gly	Pro	Gly	Ser	Gly	Ser	Val	Val	Asp	Val	Pro	Val	Val	Pro	Trp	Met	1425	1430	1435	1440
Val	Ser	Gly	Lys	Thr	Pro	Glu	Ala	Leu	Ser	Ala	Gln	Ala	Thr	Ala	Leu	1445	1450	1455	
Met	Thr	Tyr	Leu	Asp	Glu	Arg	Pro	Asp	Val	Ser	Ser	Leu	Asp	Val	Gly	1460	1465	1470	
Tyr	Ser	Leu	Ala	Leu	Thr	Arg	Ser	Ala	Leu	Asp	Glu	Arg	Ala	Val	Val	1475	1480	1485	
Leu	Gly	Ser	Asp	Arg	Glu	Thr	Leu	Leu	Cys	Gly	Val	Lys	Ala	Leu	Ser	1490	1495	1500	

Ala Gly His Glu Ala Ser Gly Leu Val Thr Gly Ser Val Gly Ala Gly			
1505	1510	1515	1520
Gly Arg Ile Gly Phe Val Phe Ser Gly Gln Gly Gly Gln Trp Leu Gly			
	1525	1530	1535
Met Gly Arg Gly Leu Tyr Arg Ala Phe Pro Val Phe Ala Ala Ala Phe			
	1540	1545	1550
Asp Glu Ala Cys Ala Glu Leu Asp Ala His Leu Gly Gln Glu Ile Gly			
	1555	1560	1565
Val Arg Glu Val Val Ser Gly Ser Asp Ala Gln Leu Leu Asp Arg Thr			
	1570	1575	1580
Leu Trp Ala Gln Ser Gly Leu Phe Ala Leu Gln Val Gly Leu Leu Lys			
1585	1590	1595	1600
Leu Leu Asp Ser Trp Gly Val Arg Pro Ser Val Val Leu Gly His Ser			
	1605	1610	1615
Val Gly Glu Leu Ala Ala Ala Phe Ala Ala Gly Val Val Ser Leu Ser			
	1620	1625	1630
Gly Ala Ala Arg Leu Val Ala Gly Arg Ala Arg Leu Met Gln Ala Leu			
	1635	1640	1645
Pro Ser Gly Gly Gly Met Leu Ala Val Pro Ala Gly Glu Glu Leu Leu			
	1650	1655	1660
Trp Ser Leu Leu Ala Asp Gln Gly Asp Arg Val Gly Ile Ala Ala Val			
1665	1670	1675	1680
Asn Ala Ala Gly Ser Val Val Leu Ser Gly Asp Arg Asp Val Leu Asp			
	1685	1690	1695
Asp Leu Ala Gly Arg Leu Asp Gly Gln Gly Ile Arg Ser Arg Trp Leu			
	1700	1705	1710
Arg Val Ser His Ala Phe His Ser Tyr Arg Met Asp Pro Met Leu Ala			
	1715	1720	1725
Glu Phe Ala Glu Leu Ala Arg Thr Val Asp Tyr Arg Arg Cys Glu Val			
	1730	1735	1740
Pro Ile Val Ser Thr Leu Thr Gly Asp Leu Asp Asp Ala Gly Arg Met			
1745	1750	1755	1760
Ser Gly Pro Asp Tyr Trp Val Arg Gln Val Arg Glu Pro Val Arg Phe			
	1765	1770	1775
Ala Asp Gly Val Gln Ala Leu Val Glu His Asp Val Ala Thr Val Val			
	1780	1785	1790
Glu Leu Gly Pro Asp Gly Ala Leu Ser Ala Leu Ile Gln Glu Cys Val			
	1795	1800	1805

Ala Ala Ser Asp His Ala Gly Arg Leu Ser Ala Val Pro Ala Met Arg			
1810	1815	1820	
Arg Asn Gln Asp Glu Ala Gln Lys Val Met Thr Ala Leu Ala His Val			
1825	1830	1835	1840
His Val Arg Gly Gly Ala Val Asp Trp Arg Ser Phe Phe Ala Gly Thr			
	1845	1850	1855
Arg Ala Lys Gln Ile Glu Leu Pro Thr Tyr Ala Phe Gln Arg Gln Arg			
	1860	1865	1870
Tyr Trp Leu Asn Ala Leu Arg Glu Ser Ser Ala Gly Asp Met Gly Arg			
	1875	1880	1885
Arg Val Glu Ala Lys Phe Trp Gly Ala Val Glu His Glu Asp Val Glu			
	1890	1895	1900
Ser Leu Ala Arg Val Leu Gly Ile Val Asp Asp Gly Ala Ala Val Asp			
1905	1910	1915	1920
Ser Leu Arg Ser Ala Leu Pro Val Leu Ala Gly Trp Gln Arg Thr Arg			
	1925	1930	1935
Thr Thr Glu Ser Ile Met Asp Gln Arg Cys Tyr Arg Ile Gly Trp Arg			
	1940	1945	1950
Gln Val Ala Gly Leu Pro Pro Met Gly Thr Val Phe Gly Thr Trp Leu			
	1955	1960	1965
Val Phe Ala Pro His Gly Trp Ser Ser Glu Pro Glu Val Val Asp Cys			
	1970	1975	1980
Val Thr Ala Leu Arg Ala Arg Gly Ala Ser Val Val Leu Val Glu Ala			
1985	1990	1995	2000
Asp Pro Asp Pro Thr Ser Phe Gly Asp Arg Val Arg Thr Leu Cys Ser			
	2005	2010	2015
Gly Leu Pro Asp Leu Val Gly Val Leu Ser Met Leu Cys Leu Glu Glu			
	2020	2025	2030
Ser Val Leu Pro Gly Phe Ser Ala Val Ser Arg Gly Phe Ala Leu Thr			
	2035	2040	2045
Val Glu Leu Val Arg Val Leu Arg Ala Ala Gly Ala Thr Ala Arg Leu			
	2050	2055	2060
Trp Leu Leu Thr Cys Gly Gly Val Ser Val Gly Asp Val Pro Val Arg			
2065	2070	2075	2080
Pro Ala Gln Ala Leu Ala Trp Gly Leu Gly Arg Val Val Gly Leu Glu			
	2085	2090	2095
His Pro Asp Trp Trp Gly Gly Leu Ile Asp Ile Pro Val Leu Phe Asp			
	2100	2105	2110

Glu Asp Ala Gln Glu Arg Leu Ser Ile Val Leu Ala Gly Leu Asp Glu	2115	2120	2125
Asp Glu Val Ala Ile Arg Pro Asp Gly Met Phe Ala Arg Arg Leu Val	2130	2135	2140
Arg His Thr Val Ser Ala Asp Val Lys Lys Ala Trp Arg Pro Arg Gly	2145	2150	2155
Ser Val Leu Val Thr Gly Gly Thr Gly Gly Leu Gly Ala His Val Ala	2165	2170	2175
Arg Trp Leu Ala Asp Ala Gly Ala Glu His Val Ala Met Val Ser Arg	2180	2185	2190
Arg Gly Glu Gln Ala Pro Ser Ala Glu Lys Leu Arg Thr Glu Leu Glu	2195	2200	2205
Asp Leu Gly Thr Arg Val Ser Ile Val Ser Cys Asp Val Thr Asp Arg	2210	2215	2220
Glu Ala Leu Ala Glu Val Leu Lys Ala Leu Pro Ala Glu Asn Pro Leu	2225	2230	2235
Thr Ala Val Val His Ala Ala Gly Val Ile Glu Thr Gly Asp Ala Ala	2245	2250	2255
Ala Met Ser Leu Ala Asp Phe Asp His Val Leu Ser Ala Lys Val Ala	2260	2265	2270
Gly Ala Ala Asn Leu Asp Ala Leu Leu Ala Asp Val Glu Leu Asp Ala	2275	2280	2285
Phe Val Leu Phe Ser Ser Val Ser Gly Val Trp Gly Ala Gly Gly His	2290	2295	2300
Gly Ala Tyr Ala Ala Ala Asn Ala Tyr Leu Asp Ala Leu Ala Glu Gln	2305	2310	2315
Arg Arg Ser Arg Gly Leu Val Ala Thr Ala Val Ala Trp Gly Pro Trp	2325	2330	2335
Ala Gly Glu Gly Met Ala Ser Gly Glu Thr Gly Asp Gln Leu Arg Arg	2340	2345	2350
Tyr Gly Leu Ser Pro Met Ala Pro Gln His Ala Ile Ala Gly Ile Arg	2355	2360	2365
Gln Ala Val Glu Gln Asp Glu Ile Ser Leu Val Val Ala Asp Val Asp	2370	2375	2380
Trp Ala Arg Phe Ser Ala Gly Leu Leu Ala Ala Arg Pro Arg Pro Leu	2385	2390	2395
Leu Asn Glu Leu Ala Glu Val Lys Glu Leu Leu Val Asp Ala Gln Pro	2405	2410	2415

tcg	ctc	aag	gag	aac	gaa	cgc	ctc	cgg	cgc	ggc	agg	gat	cgg	ttc	tcc	96
Ser	Leu	Lys	Glu	Asn	Glu	Arg	Leu	Arg	Arg	Gly	Arg	Asp	Arg	Phe	Ser	
			20					25					30			

gcg gag aag gac gat ccc atc gcg atc gtg gcg atg agt tgt cgt tat	144
Ala Glu Lys Asp Asp Pro Ile Ala Ile Val Ala Met Ser Cys Arg Tyr	
35 40 45	
ccc ggt cag gtc tcc tcg ccg gag gac ctg tgg caa ctg gct gcc ggc	192
Pro Gly Gln Val Ser Ser Pro Glu Asp Leu Trp Gln Leu Ala Ala Gly	
50 55 60	
ggt gtg gac gcg atc tcc gaa gtt ccg ggg gat cgc gga tgg gac ctg	240
Gly Val Asp Ala Ile Ser Glu Val Pro Gly Asp Arg Gly Trp Asp Leu	
65 70 75 80	
gat ggc gtg ttc gtt ccg gac tcc gat cgt cct ggc acg tcg tat gcc	288
Asp Gly Val Phe Val Pro Asp Ser Asp Arg Pro Gly Thr Ser Tyr Ala	
85 90 95	
tgc gcg ggc ggt ttt ctt cag ggc gtg tcg gag ttc gac gcg ggt ttc	336
Cys Ala Gly Gly Phe Leu Gln Gly Val Ser Glu Phe Asp Ala Gly Phe	
100 105 110	
ttc ggg att tcg ccg cgt gag gcg ctg gcg atg gat ccg cag cag cgg	384
Phe Gly Ile Ser Pro Arg Glu Ala Leu Ala Met Asp Pro Gln Gln Arg	
115 120 125	
ttg ctg ctg gaa gtc gcg tgg gag gtc ttc gag cgg gct ggg ctg gag	432
Leu Leu Leu Glu Val Ala Trp Glu Val Phe Glu Arg Ala Gly Leu Glu	
130 135 140	
cag cgg tcg aca cgc ggt tcc cgc gtt ggc gtg ttc gtc ggc acc aat	480
Gln Arg Ser Thr Arg Gly Ser Arg Val Gly Val Phe Val Gly Thr Asn	
145 150 155 160	
ggc cag gac tac gcg tcg tgg ttg cgg acg ccg ccg cct gcg gtg gca	528
Gly Gln Asp Tyr Ala Ser Trp Leu Arg Thr Pro Pro Pro Ala Val Ala	
165 170 175	
ggt cat gtg ctg acg ggc ggt gcg gca gcg gtt ctt tcg ggc cgg gtt	576
Gly His Val Leu Thr Gly Gly Ala Ala Val Leu Ser Gly Arg Val	
180 185 190	
gcg tat tcg ttc ggg ttc gag ggt cct gcg gtg acg gtg gat acg gcg	624
Ala Tyr Ser Phe Gly Phe Glu Gly Pro Ala Val Thr Val Asp Thr Ala	
195 200 205	
tgt tcg tcg tcg ttg gtg gcg ttg cac ctg gcg ggg caa gca ctg cgg	672
Cys Ser Ser Ser Leu Val Ala Leu His Leu Ala Gly Gln Ala Leu Arg	
210 215 220	
gcc ggt gag tgc gac ctt gcc ctt gcc ggt ggc gtc acg gtg atg tcg	720
Ala Gly Glu Cys Asp Leu Ala Leu Ala Gly Gly Val Thr Val Met Ser	
225 230 235 240	
acg ccg aag gtg ttc ctg gag ttc tcc cgc caa cgg ggt ctc gcg ccg	768
Thr Pro Lys Val Phe Leu Glu Phe Ser Arg Gln Arg Gly Leu Ala Pro	
245 250 255	
gat ggg cgg tgc aag tcg ttc gcg gcg ggt gcg gat ggc act gga tgg	816

Asp	Gly	Arg	Cys	Lys	Ser	Phe	Ala	Ala	Gly	Ala	Asp	Gly	Thr	Gly	Trp	
			260					265					270			
ggt	gag	ggt	gcc	gga	ctg	ttg	ttg	ctg	gag	cgg	ttg	tcg	gat	gcc	cgg	864
Gly	Glu	Gly	Ala	Gly	Leu	Leu	Leu	Leu	Glu	Arg	Leu	Ser	Asp	Ala	Arg	
			275				280					285				
cgg	aat	ggg	cat	gag	gtg	ctg	gcg	gtt	gtt	cgt	ggt	agt	gcg	gtg	aat	912
Arg	Asn	Gly	His	Glu	Val	Leu	Ala	Val	Val	Arg	Gly	Ser	Ala	Val	Asn	
	290					295					300					
cag	gac	ggt	gcg	tcg	aat	ggt	ttg	acc	gcg	ccg	aat	ggt	tcg	tcg	cag	960
Gln	Asp	Gly	Ala	Ser	Asn	Gly	Leu	Thr	Ala	Pro	Asn	Gly	Ser	Ser	Gln	
305					310					315					320	
cag	cgg	gtg	att	acc	cag	gcg	ttg	gcg	agt	gcg	ggg	ttg	tcg	gtg	tcc	1008
Gln	Arg	Val	Ile	Thr	Gln	Ala	Leu	Ala	Ser	Ala	Gly	Leu	Ser	Val	Ser	
				325					330					335		
gat	gtg	gat	gct	gtg	gag	gcg	cat	ggg	acg	ggc	acg	cgg	ctt	ggt	gat	1056
Asp	Val	Asp	Ala	Val	Glu	Ala	His	Gly	Thr	Gly	Thr	Arg	Leu	Gly	Asp	
			340					345					350			
ccg	atc	gag	gcg	cag	gcg	ctg	atc	gcc	acc	tac	ggc	cgt	gat	cgt	gat	1104
Pro	Ile	Glu	Ala	Gln	Ala	Leu	Ile	Ala	Thr	Tyr	Gly	Arg	Asp	Arg	Asp	
		355					360					365				
cct	ggc	cgg	ccg	ttg	tgg	ttg	ggg	tcg	gtc	aag	tcg	aac	atc	ggt	cat	1152
Pro	Gly	Arg	Pro	Leu	Trp	Leu	Gly	Ser	Val	Lys	Ser	Asn	Ile	Gly	His	
	370					375					380					
acg	caa	gcg	gcg	gcg	ggt	gtg	gct	ggt	gtg	atc	aag	atg	gtg	atg	gcg	1200
Thr	Gln	Ala	Ala	Ala	Gly	Val	Ala	Gly	Val	Ile	Lys	Met	Val	Met	Ala	
385					390					395					400	
atg	cgg	cac	ggg	cag	ctg	cca	cgc	acg	ttg	cac	gtg	gaa	tcg	ccg	tcg	1248
Met	Arg	His	Gly	Gln	Leu	Pro	Arg	Thr	Leu	His	Val	Glu	Ser	Pro	Ser	
				405				410						415		
ccg	gag	gtg	gat	tgg	tcg	gcg	ggg	acg	gtt	caa	ctc	ctt	acg	gag	aac	1296
Pro	Glu	Val	Asp	Trp	Ser	Ala	Gly	Thr	Val	Gln	Leu	Leu	Thr	Glu	Asn	
			420					425					430			
acg	ccc	tgg	ccc	agg	agt	ggt	cgt	gtt	cgt	cgg	gtg	ggg	gtg	tcg	tcg	1344
Thr	Pro	Trp	Pro	Arg	Ser	Gly	Arg	Val	Arg	Arg	Val	Gly	Val	Ser	Ser	
		435					440					445				
ttc	ggg	atc	agt	ggt	act	aac	gcg	cac	gtc	atc	ctc	gaa	cag	ccc	ccg	1392
Phe	Gly	Ile	Ser	Gly	Thr	Asn	Ala	His	Val	Ile	Leu	Glu	Gln	Pro	Pro	
	450					455					460					
gga	gtg	ccg	agt	cag	tct	gcg	ggg	ccg	ggt	tcg	ggt	tct	gtc	gtg	gat	1440
Gly	Val	Pro	Ser	Gln	Ser	Ala	Gly	Pro	Gly	Ser	Gly	Ser	Val	Val	Asp	
465					470				475						480	
gtt	ccg	gtg	gtg	ccg	tgg	atg	gtg	tcg	ggc	aaa	aca	ccc	gaa	gcg	cta	1488
Val	Pro	Val	Val	Pro	Trp	Met	Val	Ser	Gly	Lys	Thr	Pro	Glu	Ala	Leu	

485										490					495					
tcc	gcg	cag	gca	acg	gcg	ttg	atg	acc	tat	ctg	gac	gag	cga	cct	gat	1536				
Ser	Ala	Gln	Ala	Thr	Ala	Leu	Met	Thr	Tyr	Leu	Asp	Glu	Arg	Pro	Asp					
500						505						510								
gtc	tcc	tcg	ctg	gat	gtt	ggg	tac	tcg	ctg	gcg	ttg	aca	cgg	tcg	gcg	1584				
Val	Ser	Ser	Leu	Asp	Val	Gly	Tyr	Ser	Leu	Ala	Leu	Thr	Arg	Ser	Ala					
515						520						525								
ctg	gat	gag	cga	gcg	gtg	gtg	ctg	ggg	tcg	gac	cgt	gaa	acg	ttg	ttg	1632				
Leu	Asp	Glu	Arg	Ala	Val	Val	Leu	Gly	Ser	Asp	Arg	Glu	Thr	Leu	Leu					
530						535						540								
tgc	ggg	gtg	aaa	gcg	ctg	tct	gcc	ggg	cat	gag	gct	tct	ggg	ttg	gtg	1680				
Cys	Gly	Val	Lys	Ala	Leu	Ser	Ala	Gly	His	Glu	Ala	Ser	Gly	Leu	Val					
545						550						555								
acc	gga	tct	gtg	ggg	gct	ggg	ggc	cgc	atc	ggg	ttt	gtg	ttt	tcc	ggg	1728				
Thr	Gly	Ser	Val	Gly	Ala	Gly	Gly	Arg	Ile	Gly	Phe	Val	Phe	Ser	Gly					
			565						570						575					
cag	ggg	ggg	cag	tgg	ctg	ggg	atg	ggc	cgg	ggg	ctt	tac	cgg	gct	ttt	1776				
Gln	Gly	Gly	Gln	Trp	Leu	Gly	Met	Gly	Arg	Gly	Leu	Tyr	Arg	Ala	Phe					
			580						585						590					
ccg	gtg	ttc	gct	gct	gcc	ttt	gac	gaa	gct	tgt	gcc	gag	ctg	gat	gca	1824				
Pro	Val	Phe	Ala	Ala	Ala	Phe	Asp	Glu	Ala	Cys	Ala	Glu	Leu	Asp	Ala					
595						600						605								
cat	ctg	ggc	cag	gaa	atc	ggg	gtt	cgg	gag	gtg	gtg	tcc	ggg	tcg	gat	1872				
His	Leu	Gly	Gln	Glu	Ile	Gly	Val	Arg	Glu	Val	Val	Ser	Gly	Ser	Asp					
610						615						620								
gcg	cag	ttg	ctg	gat	cgg	acg	ttg	tgg	gcg	cag	tcg	ggg	ttg	ttc	gcg	1920				
Ala	Gln	Leu	Leu	Asp	Arg	Thr	Leu	Trp	Ala	Gln	Ser	Gly	Leu	Phe	Ala					
625						630						635			640					
ttg	cag	gtg	ggc	ttg	ctg	aag	ttg	ctg	gat	tcg	tgg	ggg	gtt	cgg	ccg	1968				
Leu	Gln	Val	Gly	Leu	Leu	Lys	Leu	Leu	Asp	Ser	Trp	Gly	Val	Arg	Pro					
			645						650						655					
agt	gtg	gtg	ttg	ggg	cat	tcg	gtg	ggc	gag	ttg	gcg	gcg	gcg	ttc	gcg	2016				
Ser	Val	Val	Leu	Gly	His	Ser	Val	Gly	Glu	Leu	Ala	Ala	Ala	Phe	Ala					
660						665						670								
gcg	ggg	gtg	gtg	tcg	ttg	tcg	ggg	gcg	gct	cgg	ttg	gtg	gcg	ggg	cgt	2064				
Ala	Gly	Val	Val	Ser	Leu	Ser	Gly	Ala	Ala	Arg	Leu	Val	Ala	Gly	Arg					
675						680						685								
gcc	cgg	ttg	atg	cag	gcg	ttg	ccg	tct	ggc	ggg	ggg	atg	ctg	gcg	gtg	2112				
Ala	Arg	Leu	Met	Gln	Ala	Leu	Pro	Ser	Gly	Gly	Gly	Met	Leu	Ala	Val					
690						695						700								
cct	gct	ggg	gag	gag	ctg	ttg	tgg	tcg	ttg	ttg	gcc	gat	cag	ggg	gat	2160				
Pro	Ala	Gly	Glu	Glu	Leu	Leu	Trp	Ser	Leu	Leu	Ala	Asp	Gln	Gly	Asp					
705						710						715			720					

cgt gtg ggg atc gcc gcg gtc aac gct gcg ggg tcg gtg gtg ctc tct	2208
Arg Val Gly Ile Ala Ala Val Asn Ala Ala Gly Ser Val Val Leu Ser	
725 730 735	
ggt gat cgg gat gtg ctc gat gac ctt gcc ggt cgg ctg gac ggg caa	2256
Gly Asp Arg Asp Val Leu Asp Asp Leu Ala Gly Arg Leu Asp Gly Gln	
740 745 750	
ggg atc cgg tcg agg tgg ttg cgg gtg tcg cat gcg ttt cat tcg tat	2304
Gly Ile Arg Ser Arg Trp Leu Arg Val Ser His Ala Phe His Ser Tyr	
755 760 765	
cgg atg gat ccg atg ctg gcg gag ttc gcc gaa ttg gca cga acc gtg	2352
Arg Met Asp Pro Met Leu Ala Glu Phe Ala Glu Leu Ala Arg Thr Val	
770 775 780	
gat tac cgg cgt tgt gaa gtg ccg atc gtg tcg acc ttg acc gga gac	2400
Asp Tyr Arg Arg Cys Glu Val Pro Ile Val Ser Thr Leu Thr Gly Asp	
785 790 795 800	
ctc gat gac gct ggc agg atg agc ggg ccc gac tac tgg gtg cgt cag	2448
Leu Asp Asp Ala Gly Arg Met Ser Gly Pro Asp Tyr Trp Val Arg Gln	
805 810 815	
gtg cga gag ccg gtc cgc ttc gcc gac ggt gtc cag gcg ctg gtc gag	2496
Val Arg Glu Pro Val Arg Phe Ala Asp Gly Val Gln Ala Leu Val Glu	
820 825 830	
cac gat gtg gcc act gtt gtc gag ctc ggt ccg gac ggg gcg ttg tcg	2544
His Asp Val Ala Thr Val Val Glu Leu Gly Pro Asp Gly Ala Leu Ser	
835 840 845	
gcg ctg atc cag gaa tgt gtc gcc gca tcc gat cac gcc ggg cgg ctg	2592
Ala Leu Ile Gln Glu Cys Val Ala Ala Ser Asp His Ala Gly Arg Leu	
850 855 860	
agc gcg gtc ccg gcg atg cgc agg aac cag gac gag gcg cag aag gtg	2640
Ser Ala Val Pro Ala Met Arg Arg Asn Gln Asp Glu Ala Gln Lys Val	
865 870 875 880	
atg acg gcc ctg gca cac gtc cac gta cgt ggt ggt gcg gtg gac tgg	2688
Met Thr Ala Leu Ala His Val His Val Arg Gly Gly Ala Val Asp Trp	
885 890 895	
cgg tcg ttc ttc gcc ggt acg gga gcg aaa caa atc gag ctg ccc acc	2736
Arg Ser Phe Phe Ala Gly Thr Gly Ala Lys Gln Ile Glu Leu Pro Thr	
900 905 910	
tac gcc ttc caa cga cag cgg tac tgg ctg gtg cca tcg gat tcc ggt	2784
Tyr Ala Phe Gln Arg Gln Arg Tyr Trp Leu Val Pro Ser Asp Ser Gly	
915 920 925	
gat gtg aca ggt gcc ggt ctg gcc ggg gcg gag cat ccg ctg ttg ggt	2832
Asp Val Thr Gly Ala Gly Leu Ala Gly Ala Glu His Pro Leu Leu Gly	
930 935 940	

gct gtg gtg ccg gtc gcg ggt ggt gac gag gtg ttg ctg acc ggc agg	2880
Ala Val Val Pro Val Ala Gly Gly Asp Glu Val Leu Leu Thr Gly Arg	
945 950 955 960	
att tcg gtg cgg acg cat ccg tgg ctg gcc gaa cac cgg gtg ctg ggt	2928
Ile Ser Val Arg Thr His Pro Trp Leu Ala Glu His Arg Val Leu Gly	
965 970 975	
gaa gtg atc gtt gcg ggc acc gcg ttg ctg gag atc gcc ttg cac gcg	2976
Glu Val Ile Val Ala Gly Thr Ala Leu Leu Glu Ile Ala Leu His Ala	
980 985 990	
ggg gaa cgt ctt ggt tgt gaa cgg gtg gaa gag ctg acc ctg gaa gca	3024
Gly Glu Arg Leu Gly Cys Glu Arg Val Glu Glu Leu Thr Leu Glu Ala	
995 1000 1005	
ccg ctg gtc ctg ccg gag cgc ggg gcg atc cag gtt cag ctg cga gtg	3072
Pro Leu Val Leu Pro Glu Arg Gly Ala Ile Gln Val Gln Leu Arg Val	
1010 1015 1020	
ggc gcg ccc gag aat tcc gga cgc agg ccg atg gcg ctg tat tca cgc	3120
Gly Ala Pro Glu Asn Ser Gly Arg Arg Pro Met Ala Leu Tyr Ser Arg	
1025 1030 1035 1040	
ccc gaa ggg gcg gcg gag cat gac tgg acg cgg cac gcc acg ggc cgg	3168
Pro Glu Gly Ala Ala Glu His Asp Trp Thr Arg His Ala Thr Gly Arg	
1045 1050 1055	
ttg gcg cca ggc cgc ggc gag gcg gct gga gac ctg gcc gac tgg ccg	3216
Leu Ala Pro Gly Arg Gly Glu Ala Ala Gly Asp Leu Ala Asp Trp Pro	
1060 1065 1070	
gct cct ggc gcg ctg ccg gtc gac ctg gac gaa ttc tat cgg qac ctg	3264
Ala Pro Gly Ala Leu Pro Val Asp Leu Asp Glu Phe Tyr Arg Asp Leu	
1075 1080 1085	
gca gag ctt ggg ctg gag tac ggc ccg atc ttc caa ggg ctg aag gcg	3312
Ala Glu Leu Gly Leu Glu Tyr Gly Pro Ile Phe Gln Gly Leu Lys Ala	
1090 1095 1100	
gcc tgg cgg caa ggg gac gag gtg tac gcc gaa gcc gcg ctg ccg gga	3360
Ala Trp Arg Gln Gly Asp Glu Val Tyr Ala Glu Ala Ala Leu Pro Gly	
1105 1110 1115 1120	
acg gaa gat tct ggt ttc ggg gtg cat ccg gca ctg ctg gac gcg gct	3408
Thr Glu Asp Ser Gly Phe Gly Val His Pro Ala Leu Leu Asp Ala Ala	
1125 1130 1135	
ctg cac gca acg gct gtc cga gac atg gat gac gca cgc ttg ccg ttc	3456
Leu His Ala Thr Ala Val Arg Asp Met Asp Asp Ala Arg Leu Pro Phe	
1140 1145 1150	
cag tgg gaa ggt gtg tcc ctg cac gcc aag gcc gcg ccg gct ttg cgg	3504
Gln Trp Glu Gly Val Ser Leu His Ala Lys Ala Ala Pro Ala Leu Arg	
1155 1160 1165	
gtc cgc gtg gtc ccg gct ggt gac gat gcc aag tcc ctg ctg gtt tgt	3552

Val Arg Val Val Pro Ala Gly Asp Asp Ala Lys Ser Leu Leu Val Cys	
1170 1175 1180	
gat ggc acc ggt cga ccg gtg atc tcg gtg gac cga ctc gta ttg cgg	3600
Asp Gly Thr Gly Arg Pro Val Ile Ser Val Asp Arg Leu Val Leu Arg	
1185 1190 1195 1200	
tcg gct gcg gcc cgg cgg acc ggt gcg cgc cga cag gcc cat caa gct	3648
Ser Ala Ala Ala Arg Arg Thr Gly Ala Arg Arg Gln Ala His Gln Ala	
1205 1210 1215	
cgg ttg tac cgg ttg agc tgg cca acg gtt caa ctg ccg aca tcc gct	3696
Arg Leu Tyr Arg Leu Ser Trp Pro Thr Val Gln Leu Pro Thr Ser Ala	
1220 1225 1230	
cag cca ccg tcc tgc gtg ctt ctc ggc acc tca gaa gtg tcc gct gac	3744
Gln Pro Pro Ser Cys Val Leu Leu Gly Thr Ser Glu Val Ser Ala Asp	
1235 1240 1245	
ata cag gtg tat ccg gac ctc cgg tcg ttg acg gct gcg ttg gat gcc	3792
Ile Gln Val Tyr Pro Asp Leu Arg Ser Leu Thr Ala Ala Leu Asp Ala	
1250 1255 1260	
ggt gcc gaa cca ccc ggc gtc gtc atc gca ccc acg ccc ccc ggc ggt	3840
Gly Ala Glu Pro Pro Gly Val Val Ile Ala Pro Thr Pro Pro Gly Gly	
1265 1270 1275 1280	
gga cga aca gcg gat gtc cgg gag acg act cgg cat gca ctc gac ctg	3888
Gly Arg Thr Ala Asp Val Arg Glu Thr Thr Arg His Ala Leu Asp Leu	
1285 1290 1295	
gta caa ggc tgg ctt tcc gat cag cga ctc aac gaa tcc cga ttg ctc	3936
Val Gln Gly Trp Leu Ser Asp Gln Arg Leu Asn Glu Ser Arg Leu Leu	
1300 1305 1310	
ctg gtg aca cag gga gca gtg gcc gtg gag ccg ggc gaa ccc gtg acc	3984
Leu Val Thr Gln Gly Ala Val Ala Val Glu Pro Gly Glu Pro Val Thr	
1315 1320 1325	
gat ctg gcg cag gcc gcg ctc tgg gga ctg ctg cgg tcg acg cag acc	4032
Asp Leu Ala Gln Ala Ala Leu Trp Gly Leu Leu Arg Ser Thr Gln Thr	
1330 1335 1340	
gaa cac cct gat cgc ttc gtc ctc gtc gat gtg cct gag ccc gcg caa	4080
Glu His Pro Asp Arg Phe Val Leu Val Asp Val Pro Glu Pro Ala Gln	
1345 1350 1355 1360	
ctc ctc ccc gcg ctg ccg ggg gtg ctg gcc tgc ggc gaa cct cag ctc	4128
Leu Leu Pro Ala Leu Pro Gly Val Leu Ala Cys Gly Glu Pro Gln Leu	
1365 1370 1375	
gcg ttg cga cgt ggc ggc gct cat gcg ccc aga ctg gct gga ctg ggc	4176
Ala Leu Arg Arg Gly Gly Ala His Ala Pro Arg Leu Ala Gly Leu Gly	
1380 1385 1390	
agc gat gac gtc ctg ccc gtg ccg gac ggc acc ggg tgg cga ttg gag	4224
Ser Asp Asp Val Leu Pro Val Pro Asp Gly Thr Gly Trp Arg Leu Glu	

1395	1400	1405	
gcc acg cgc ccg gga agc ctg gat ggg ttg gca ttg gtg gac gaa ccg Ala Thr Arg Pro Gly Ser Leu Asp Gly Leu Ala Leu Val Asp Glu Pro 1410 1415 1420			4272
acg gcc acg gca ccg ctg ggt gac ggt gag gtc agg att gcg atg cgc Thr Ala Thr Ala Pro Leu Gly Asp Gly Glu Val Arg Ile Ala Met Arg 1425 1430 1435 1440			4320
gcg gcc ggg gtg aac ttc cgg gat gcg ctc atc gcg ctc ggt atg tat Ala Ala Gly Val Asn Phe Arg Asp Ala Leu Ile Ala Leu Gly Met Tyr 1445 1450 1455			4368
ccc ggt gtg gca tcg ctg ggc agt gag ggc gcc ggg gtc gtg gtg gag Pro Gly Val Ala Ser Leu Gly Ser Glu Gly Ala Gly Val Val Val Glu 1460 1465 1470			4416
acc ggc ccc ggc gtc acc ggc ctg gca ccc ggc gac cgc gtg atg gga Thr Gly Pro Gly Val Thr Gly Leu Ala Pro Gly Asp Arg Val Met Gly 1475 1480 1485			4464
atg atc ccg aag gcg ttc ggg ccg ctc gcg gtc gcc gac cat cgc atg Met Ile Pro Lys Ala Phe Gly Pro Leu Ala Val Ala Asp His Arg Met 1490 1495 1500			4512
gtg acg agg att ccc gct ggt tgg agc ttc gcg cgg gcc gca tcg gtg Val Thr Arg Ile Pro Ala Gly Trp Ser Phe Ala Arg Ala Ala Ser Val 1505 1510 1515 1520			4560
ccg atc gtc ttt ctc acc gcc tac tac gcg ctg gtt gat ctc gcc ggg Pro Ile Val Phe Leu Thr Ala Tyr Tyr Ala Leu Val Asp Leu Ala Gly 1525 1530 1535			4608
ttg aga cca ggg gag tcg ttg ctg gtt cat tcg gcc gcc ggt ggg gtg Leu Arg Pro Gly Glu Ser Leu Leu Val His Ser Ala Ala Gly Gly Val 1540 1545 1550			4656
ggg atg gcc gcg atc caa ctc gcc agg cac ctc ggt gca gag gtg tac Gly Met Ala Ala Ile Gln Leu Ala Arg His Leu Gly Ala Glu Val Tyr 1555 1560 1565			4704
gcc acc gct agc gag gac aag tgg caa gcc gtg gag ctg agc cga gaa Ala Thr Ala Ser Glu Asp Lys Trp Gln Ala Val Glu Leu Ser Arg Glu 1570 1575 1580			4752
cac ctc gct tcg tcg cgg acg tgc gat ttc gag cag cag ttc ctc ggg His Leu Ala Ser Ser Arg Thr Cys Asp Phe Glu Gln Gln Phe Leu Gly 1585 1590 1595 1600			4800
gca acc ggc gga cgc ggc gtc gac gtc gtg ctc aac tcc ctc gcc ggg Ala Thr Gly Gly Arg Gly Val Asp Val Val Leu Asn Ser Leu Ala Gly 1605 1610 1615			4848
gag ttc gcc gat gcg tct ctg cga atg ctg ccg cgc ggt ggc cgt ttc Glu Phe Ala Asp Ala Ser Leu Arg Met Leu Pro Arg Gly Gly Arg Phe 1620 1625 1630			4896

ctg gag ttg ggg aag acg gat gtt cgt gac ccc gtc gag gtc gcc gat	4944
Leu Glu Leu Gly Lys Thr Asp Val Arg Asp Pro Val Glu Val Ala Asp	
1635 1640 1645	
gcg cat ccg ggc gtg tct tac cag gct ttc gat acc gta gag gca ggc	4992
Ala His Pro Gly Val Ser Tyr Gln Ala Phe Asp Thr Val Glu Ala Gly	
1650 1655 1660	
ccg cag cga atc ggc gag atg ctt cac gag ctg gtg gag ttg ttc gag	5040
Pro Gln Arg Ile Gly Glu Met Leu His Glu Leu Val Glu Leu Phe Glu	
1665 1670 1675 1680	
gga cgc gtg ctg gag ccc ctg cct gtc acg gct tgg gac gtt cgg cag	5088
Gly Arg Val Leu Glu Pro Leu Pro Val Thr Ala Trp Asp Val Arg Gln	
1685 1690 1695	
gcg ccc gag gcg cta cgg cac ctg agc caa gcg cgg cat gtg gga aag	5136
Ala Pro Glu Ala Leu Arg His Leu Ser Gln Ala Arg His Val Gly Lys	
1700 1705 1710	
ctg gtg ctc acc atg cct ccg gtg tgg gac gcc gca ggc acg gtt ctg	5184
Leu Val Leu Thr Met Pro Pro Val Trp Asp Ala Ala Gly Thr Val Leu	
1715 1720 1725	
gtt acc ggc gga acg gga gca ctt ggc gca gag gtc gcc cgg cac ctc	5232
Val Thr Gly Gly Thr Gly Ala Leu Gly Ala Glu Val Ala Arg His Leu	
1730 1735 1740	
gtg atc gag cgc ggg gtg cga aac ctg gtc ctc gtc agc agg cgc ggt	5280
Val Ile Glu Arg Gly Val Arg Asn Leu Val Leu Val Ser Arg Arg Gly	
1745 1750 1755 1760	
ccc gca gcc agt ggc gct gct gag ctc gtg gcg caa ctg acg gcc tac	5328
Pro Ala Ala Ser Gly Ala Ala Glu Leu Val Ala Gln Leu Thr Ala Tyr	
1765 1770 1775	
ggt gcc gag gtt tcc ttg cag gct tgc gat gtc gcc gat cgt gag acc	5376
Gly Ala Glu Val Ser Leu Gln Ala Cys Asp Val Ala Asp Arg Glu Thr	
1780 1785 1790	
ttg gcg aag gtg ctt gcc agc atc ccg gac gag cat ccg ttg acc gcc	5424
Leu Ala Lys Val Leu Ala Ser Ile Pro Asp Glu His Pro Leu Thr Ala	
1795 1800 1805	
gtg gtg cac gcg gct ggt gtt ctc gac gac gga gtg tcc gaa tcg ctc	5472
Val Val His Ala Ala Gly Val Leu Asp Asp Gly Val Ser Glu Ser Leu	
1810 1815 1820	
acc gtg gag cgg ctg gac cag gtt ctg cgc ccg aag gtc gat ggc gcg	5520
Thr Val Glu Arg Leu Asp Gln Val Leu Arg Pro Lys Val Asp Gly Ala	
1825 1830 1835 1840	
cgg aat ctg ctc gag ctg atc gac ccg gac gtg gcc ctc gtg ttg ttc	5568
Arg Asn Leu Leu Glu Leu Ile Asp Pro Asp Val Ala Leu Val Leu Phe	
1845 1850 1855	

tcg tcg gtg tcg ggt gtg ctc ggc agc ggt ggg cag ggt aac tac gcg Ser Ser Val Ser Gly Val Leu Gly Ser Gly Gly Gln Gly Asn Tyr Ala 1860 1865 1870	5616
gcg gcc aac tcc ttc ctc gac gca ttg gcg cag caa agg cag tcg cgc Ala Ala Asn Ser Phe Leu Asp Ala Leu Ala Gln Gln Arg Gln Ser Arg 1875 1880 1885	5664
ggc cta ccg acg aga tca ttg gcc tgg ggg ccc tgg gcg gaa cat ggc Gly Leu Pro Thr Arg Ser Leu Ala Trp Gly Pro Trp Ala Glu His Gly 1890 1895 1900	5712
atg gcc agc acc ttg cgc gaa gcc gag cag gat cga ttg gcg cga tct Met Ala Ser Thr Leu Arg Glu Ala Glu Gln Asp Arg Leu Ala Arg Ser 1905 1910 1915 1920	5760
ggg ttg ctg ccg atc tcg acc gag gag ggg ttg tcc cag ttc gac gcc Gly Leu Leu Pro Ile Ser Thr Glu Glu Gly Leu Ser Gln Phe Asp Ala 1925 1930 1935	5808
gcg tgc ggc ggc gcg cat acc gtg gtg gcg ccg gtt cga ttc agc cgc Ala Cys Gly Gly Ala His Thr Val Val Ala Pro Val Arg Phe Ser Arg 1940 1945 1950	5856
ttg tcc gac ggg aac gcg atc aag ttc tcc gtc ctg caa ggt ttg gtc Leu Ser Asp Gly Asn Ala Ile Lys Phe Ser Val Leu Gln Gly Leu Val 1955 1960 1965	5904
ggg ccg cat cgc gtc aac aaa gcg gcg act gcg gat gat gcc gag agc Gly Pro His Arg Val Asn Lys Ala Ala Thr Ala Asp Asp Ala Glu Ser 1970 1975 1980	5952
ctc cgg aaa cgg ttg gga cgc ttg ccg gat gca gaa caa cat cgg att Leu Arg Lys Arg Leu Gly Arg Leu Pro Asp Ala Glu Gln His Arg Ile 1985 1990 1995 2000	6000
ctg ctg gac ctc gtc cgc atg cat gtg gcg gca gtg ctc gga ttc gcc Leu Leu Asp Leu Val Arg Met His Val Ala Ala Val Leu Gly Phe Ala 2005 2010 2015	6048
ggt tct cag gag atc acc gcg gac ggc acg ttc aag gtg ctg ggc ttc Gly Ser Gln Glu Ile Thr Ala Asp Gly Thr Phe Lys Val Leu Gly Phe 2020 2025 2030	6096
gac tcg ttg acc gtg gtc gag ttg cgc aac cgg atc aac ggg gcg acg Asp Ser Leu Thr Val Val Glu Leu Arg Asn Arg Ile Asn Gly Ala Thr 2035 2040 2045	6144
ggg ctg cga ctg ccc gcc acc ctg gtg ttc aac tac ccg acg ccg gat Gly Leu Arg Leu Pro Ala Thr Leu Val Phe Asn Tyr Pro Thr Pro Asp 2050 2055 2060	6192
gcg ctc gcc gcg cac ctc gtc acc gcg ctg tcc gca gac cgc ctg gcc Ala Leu Ala Ala His Leu Val Thr Ala Leu Ser Ala Asp Arg Leu Ala 2065 2070 2075 2080	6240
ggg aca ttc gag gaa ctc gac agg tgg gcg gcg aac ctg ccc acg ctg	6288

Gly Thr Phe Glu Glu Leu Asp Arg Trp Ala Ala Asn Leu Pro Thr Leu	
2085 2090 2095	
gcc agg gat gag gcc acg cgg gcg cag atc acc acc cgg cta cag gcg	6336
Ala Arg Asp Glu Ala Thr Arg Ala Gln Ile Thr Thr Arg Leu Gln Ala	
2100 2105 2110	
atc ttg cag agc ctg gcg gac gtg tcc ggc gga acc ggc ggc ggc tcc	6384
Ile Leu Gln Ser Leu Ala Asp Val Ser Gly Gly Thr Gly Gly Gly Ser	
2115 2120 2125	
gtg ccg gac cgg ctc aga tcg gcc acg gac gac gag ctt ttc caa ctc	6432
Val Pro Asp Arg Leu Arg Ser Ala Thr Asp Asp Glu Leu Phe Gln Leu	
2130 2135 2140	
ctc gac aac gat ctc gaa ctt ccc tga	6459
Leu Asp Asn Asp Leu Glu Leu Pro	
2145 2150	

<210> 44
 <211> 2152
 <212> PRT
 <213> Saccharopolyspora spinosa

<400> 44	
Met Thr Val Thr Thr Ser Tyr Glu Glu Val Val Glu Ala Leu Arg Ala	
1 5 10 15	
Ser Leu Lys Glu Asn Glu Arg Leu Arg Arg Gly Arg Asp Arg Phe Ser	
20 25 30	
Ala Glu Lys Asp Asp Pro Ile Ala Ile Val Ala Met Ser Cys Arg Tyr	
35 40 45	
Pro Gly Gln Val Ser Ser Pro Glu Asp Leu Trp Gln Leu Ala Ala Gly	
50 55 60	
Gly Val Asp Ala Ile Ser Glu Val Pro Gly Asp Arg Gly Trp Asp Leu	
65 70 75 80	
Asp Gly Val Phe Val Pro Asp Ser Asp Arg Pro Gly Thr Ser Tyr Ala	
85 90 95	
Cys Ala Gly Gly Phe Leu Gln Gly Val Ser Glu Phe Asp Ala Gly Phe	
100 105 110	
Phe Gly Ile Ser Pro Arg Glu Ala Leu Ala Met Asp Pro Gln Gln Arg	
115 120 125	
Leu Leu Leu Glu Val Ala Trp Glu Val Phe Glu Arg Ala Gly Leu Glu	
130 135 140	
Gln Arg Ser Thr Arg Gly Ser Arg Val Gly Val Phe Val Gly Thr Asn	
145 150 155 160	
Gly Gln Asp Tyr Ala Ser Trp Leu Arg Thr Pro Pro Pro Ala Val Ala	

165					170					175					
Gly	His	Val	Leu	Thr	Gly	Gly	Ala	Ala	Ala	Val	Leu	Ser	Gly	Arg	Val
			180					185					190		
Ala	Tyr	Ser	Phe	Gly	Phe	Glu	Gly	Pro	Ala	Val	Thr	Val	Asp	Thr	Ala
		195					200					205			
Cys	Ser	Ser	Ser	Leu	Val	Ala	Leu	His	Leu	Ala	Gly	Gln	Ala	Leu	Arg
	210					215					220				
Ala	Gly	Glu	Cys	Asp	Leu	Ala	Leu	Ala	Gly	Gly	Val	Thr	Val	Met	Ser
225					230					235					240
Thr	Pro	Lys	Val	Phe	Leu	Glu	Phe	Ser	Arg	Gln	Arg	Gly	Leu	Ala	Pro
				245					250					255	
Asp	Gly	Arg	Cys	Lys	Ser	Phe	Ala	Ala	Gly	Ala	Asp	Gly	Thr	Gly	Trp
			260					265					270		
Gly	Glu	Gly	Ala	Gly	Leu	Leu	Leu	Leu	Glu	Arg	Leu	Ser	Asp	Ala	Arg
		275					280					285			
Arg	Asn	Gly	His	Glu	Val	Leu	Ala	Val	Val	Arg	Gly	Ser	Ala	Val	Asn
	290					295					300				
Gln	Asp	Gly	Ala	Ser	Asn	Gly	Leu	Thr	Ala	Pro	Asn	Gly	Ser	Ser	Gln
305					310					315					320
Gln	Arg	Val	Ile	Thr	Gln	Ala	Leu	Ala	Ser	Ala	Gly	Leu	Ser	Val	Ser
				325					330					335	
Asp	Val	Asp	Ala	Val	Glu	Ala	His	Gly	Thr	Gly	Thr	Arg	Leu	Gly	Asp
			340					345					350		
Pro	Ile	Glu	Ala	Gln	Ala	Leu	Ile	Ala	Thr	Tyr	Gly	Arg	Asp	Arg	Asp
		355				360						365			
Pro	Gly	Arg	Pro	Leu	Trp	Leu	Gly	Ser	Val	Lys	Ser	Asn	Ile	Gly	His
	370					375					380				
Thr	Gln	Ala	Ala	Ala	Gly	Val	Ala	Gly	Val	Ile	Lys	Met	Val	Met	Ala
385					390					395					400
Met	Arg	His	Gly	Gln	Leu	Pro	Arg	Thr	Leu	His	Val	Glu	Ser	Pro	Ser
				405					410					415	
Pro	Glu	Val	Asp	Trp	Ser	Ala	Gly	Thr	Val	Gln	Leu	Leu	Thr	Glu	Asn
			420					425					430		
Thr	Pro	Trp	Pro	Arg	Ser	Gly	Arg	Val	Arg	Arg	Val	Gly	Val	Ser	Ser
		435					440					445			
Phe	Gly	Ile	Ser	Gly	Thr	Asn	Ala	His	Val	Ile	Leu	Glu	Gln	Pro	Pro
	450					455					460				
Gly	Val	Pro	Ser	Gln	Ser	Ala	Gly	Pro	Gly	Ser	Gly	Ser	Val	Val	Asp

465		470		475		480
Val Pro Val Val	Pro Trp Met Val	Ser Gly Lys Thr	Pro Glu Ala Leu			
	485	490	495			
Ser Ala Gln Ala	Thr Ala Leu Met	Thr Tyr Leu Asp	Glu Arg Pro Asp			
	500	505	510			
Val Ser Ser Leu	Asp Val Gly Tyr	Ser Leu Ala Leu	Thr Arg Ser Ala			
	515	520	525			
Leu Asp Glu Arg	Ala Val Val Leu	Gly Ser Asp Arg	Glu Thr Leu Leu			
	530	535	540			
Cys Gly Val Lys	Ala Leu Ser Ala	Gly His Glu Ala	Ser Gly Leu Val			
545	550	555	560			
Thr Gly Ser Val	Gly Ala Gly Gly	Arg Ile Gly Phe	Val Phe Ser Gly			
	565	570	575			
Gln Gly Gly Gln	Trp Leu Gly Met	Gly Arg Gly Leu	Tyr Arg Ala Phe			
	580	585	590			
Pro Val Phe Ala	Ala Ala Phe Asp	Glu Ala Cys Ala	Glu Leu Asp Ala			
	595	600	605			
His Leu Gly Gln	Glu Ile Gly Val	Arg Glu Val Val	Ser Gly Ser Asp			
	610	615	620			
Ala Gln Leu Leu	Asp Arg Thr Leu	Trp Ala Gln Ser	Gly Leu Phe Ala			
625	630	635	640			
Leu Gln Val Gly	Leu Leu Lys Leu	Leu Asp Ser Trp	Gly Val Arg Pro			
	645	650	655			
Ser Val Val Leu	Gly His Ser Val	Gly Glu Leu Ala	Ala Ala Phe Ala			
	660	665	670			
Ala Gly Val Val	Ser Leu Ser Gly	Ala Ala Arg Leu	Val Ala Gly Arg			
	675	680	685			
Ala Arg Leu Met	Gln Ala Leu Pro	Ser Gly Gly Gly	Met Leu Ala Val			
	690	695	700			
Pro Ala Gly Glu	Glu Leu Leu Trp	Ser Leu Leu Ala	Asp Gln Gly Asp			
705	710	715	720			
Arg Val Gly Ile	Ala Ala Val Asn	Ala Ala Gly Ser	Val Val Leu Ser			
	725	730	735			
Gly Asp Arg Asp	Val Leu Asp Asp	Leu Ala Gly Arg	Leu Asp Gly Gln			
	740	745	750			
Gly Ile Arg Ser	Arg Trp Leu Arg	Val Ser His Ala	Phe His Ser Tyr			
	755	760	765			
Arg Met Asp Pro	Met Leu Ala Glu	Phe Ala Glu Leu	Ala Arg Thr Val			

770					775					780					
Asp	Tyr	Arg	Arg	Cys	Glu	Val	Pro	Ile	Val	Ser	Thr	Leu	Thr	Gly	Asp
785					790					795					800
Leu	Asp	Asp	Ala	Gly	Arg	Met	Ser	Gly	Pro	Asp	Tyr	Trp	Val	Arg	Gln
				805					810					815	
Val	Arg	Glu	Pro	Val	Arg	Phe	Ala	Asp	Gly	Val	Gln	Ala	Leu	Val	Glu
			820						825				830		
His	Asp	Val	Ala	Thr	Val	Val	Glu	Leu	Gly	Pro	Asp	Gly	Ala	Leu	Ser
		835					840					845			
Ala	Leu	Ile	Gln	Glu	Cys	Val	Ala	Ala	Ser	Asp	His	Ala	Gly	Arg	Leu
	850					855					860				
Ser	Ala	Val	Pro	Ala	Met	Arg	Arg	Asn	Gln	Asp	Glu	Ala	Gln	Lys	Val
865					870					875					880
Met	Thr	Ala	Leu	Ala	His	Val	His	Val	Arg	Gly	Gly	Ala	Val	Asp	Trp
				885					890					895	
Arg	Ser	Phe	Phe	Ala	Gly	Thr	Gly	Ala	Lys	Gln	Ile	Glu	Leu	Pro	Thr
			900					905					910		
Tyr	Ala	Phe	Gln	Arg	Gln	Arg	Tyr	Trp	Leu	Val	Pro	Ser	Asp	Ser	Gly
		915					920					925			
Asp	Val	Thr	Gly	Ala	Gly	Leu	Ala	Gly	Ala	Glu	His	Pro	Leu	Leu	Gly
	930					935					940				
Ala	Val	Val	Pro	Val	Ala	Gly	Gly	Asp	Glu	Val	Leu	Leu	Thr	Gly	Arg
945					950					955					960
Ile	Ser	Val	Arg	Thr	His	Pro	Trp	Leu	Ala	Glu	His	Arg	Val	Leu	Gly
				965				970						975	
Glu	Val	Ile	Val	Ala	Gly	Thr	Ala	Leu	Leu	Glu	Ile	Ala	Leu	His	Ala
		980						985					990		
Gly	Glu	Arg	Leu	Gly	Cys	Glu	Arg	Val	Glu	Glu	Leu	Thr	Leu	Glu	Ala
	995						1000					1005			
Pro	Leu	Val	Leu	Pro	Glu	Arg	Gly	Ala	Ile	Gln	Val	Gln	Leu	Arg	Val
	1010					1015					1020				
Gly	Ala	Pro	Glu	Asn	Ser	Gly	Arg	Arg	Pro	Met	Ala	Leu	Tyr	Ser	Arg
1025				1030						1035				1040	
Pro	Glu	Gly	Ala	Ala	Glu	His	Asp	Trp	Thr	Arg	His	Ala	Thr	Gly	Arg
			1045						1050					1055	
Leu	Ala	Pro	Gly	Arg	Gly	Glu	Ala	Ala	Gly	Asp	Leu	Ala	Asp	Trp	Pro
		1060					1065					1070			
Ala	Pro	Gly	Ala	Leu	Pro	Val	Asp	Leu	Asp	Glu	Phe	Tyr	Arg	Asp	Leu

1075	1080	1085
Ala Glu Leu Gly Leu Glu Tyr Gly Pro Ile Phe Gln Gly Leu Lys Ala 1090	1095	1100
Ala Trp Arg Gln Gly Asp Glu Val Tyr Ala Glu Ala Ala Leu Pro Gly 1105	1110	1115 1120
Thr Glu Asp Ser Gly Phe Gly Val His Pro Ala Leu Leu Asp Ala Ala 1125	1130	1135
Leu His Ala Thr Ala Val Arg Asp Met Asp Asp Ala Arg Leu Pro Phe 1140	1145	1150
Gln Trp Glu Gly Val Ser Leu His Ala Lys Ala Ala Pro Ala Leu Arg 1155	1160	1165
Val Arg Val Val Pro Ala Gly Asp Asp Ala Lys Ser Leu Leu Val Cys 1170	1175	1180
Asp Gly Thr Gly Arg Pro Val Ile Ser Val Asp Arg Leu Val Leu Arg 1185	1190	1195 1200
Ser Ala Ala Ala Arg Arg Thr Gly Ala Arg Arg Gln Ala His Gln Ala 1205	1210	1215
Arg Leu Tyr Arg Leu Ser Trp Pro Thr Val Gln Leu Pro Thr Ser Ala 1220	1225	1230
Gln Pro Pro Ser Cys Val Leu Leu Gly Thr Ser Glu Val Ser Ala Asp 1235	1240	1245
Ile Gln Val Tyr Pro Asp Leu Arg Ser Leu Thr Ala Ala Leu Asp Ala 1250	1255	1260
Gly Ala Glu Pro Pro Gly Val Val Ile Ala Pro Thr Pro Pro Gly Gly 1265	1270	1275 1280
Gly Arg Thr Ala Asp Val Arg Glu Thr Thr Arg His Ala Leu Asp Leu 1285	1290	1295
Val Gln Gly Trp Leu Ser Asp Gln Arg Leu Asn Glu Ser Arg Leu Leu 1300	1305	1310
Leu Val Thr Gln Gly Ala Val Ala Val Glu Pro Gly Glu Pro Val Thr 1315	1320	1325
Asp Leu Ala Gln Ala Ala Leu Trp Gly Leu Leu Arg Ser Thr Gln Thr 1330	1335	1340
Glu His Pro Asp Arg Phe Val Leu Val Asp Val Pro Glu Pro Ala Gln 1345	1350	1355 1360
Leu Leu Pro Ala Leu Pro Gly Val Leu Ala Cys Gly Glu Pro Gln Leu 1365	1370	1375
Ala Leu Arg Arg Gly Gly Ala His Ala Pro Arg Leu Ala Gly Leu Gly		

1380	1385	1390
Ser Asp Asp Val Leu Pro Val Pro Asp Gly Thr Gly Trp Arg Leu Glu 1395 1400 1405		
Ala Thr Arg Pro Gly Ser Leu Asp Gly Leu Ala Leu Val Asp Glu Pro 1410 1415 1420		
Thr Ala Thr Ala Pro Leu Gly Asp Gly Glu Val Arg Ile Ala Met Arg 1425 1430 1435 1440		
Ala Ala Gly Val Asn Phe Arg Asp Ala Leu Ile Ala Leu Gly Met Tyr 1445 1450 1455		
Pro Gly Val Ala Ser Leu Gly Ser Glu Gly Ala Gly Val Val Val Glu 1460 1465 1470		
Thr Gly Pro Gly Val Thr Gly Leu Ala Pro Gly Asp Arg Val Met Gly 1475 1480 1485		
Met Ile Pro Lys Ala Phe Gly Pro Leu Ala Val Ala Asp His Arg Met 1490 1495 1500		
Val Thr Arg Ile Pro Ala Gly Trp Ser Phe Ala Arg Ala Ala Ser Val 1505 1510 1515 1520		
Pro Ile Val Phe Leu Thr Ala Tyr Tyr Ala Leu Val Asp Leu Ala Gly 1525 1530 1535		
Leu Arg Pro Gly Glu Ser Leu Leu Val His Ser Ala Ala Gly Gly Val 1540 1545 1550		
Gly Met Ala Ala Ile Gln Leu Ala Arg His Leu Gly Ala Glu Val Tyr 1555 1560 1565		
Ala Thr Ala Ser Glu Asp Lys Trp Gln Ala Val Glu Leu Ser Arg Glu 1570 1575 1580		
His Leu Ala Ser Ser Arg Thr Cys Asp Phe Glu Gln Gln Phe Leu Gly 1585 1590 1595 1600		
Ala Thr Gly Gly Arg Gly Val Asp Val Val Leu Asn Ser Leu Ala Gly 1605 1610 1615		
Glu Phe Ala Asp Ala Ser Leu Arg Met Leu Pro Arg Gly Gly Arg Phe 1620 1625 1630		
Leu Glu Leu Gly Lys Thr Asp Val Arg Asp Pro Val Glu Val Ala Asp 1635 1640 1645		
Ala His Pro Gly Val Ser Tyr Gln Ala Phe Asp Thr Val Glu Ala Gly 1650 1655 1660		
Pro Gln Arg Ile Gly Glu Met Leu His Glu Leu Val Glu Leu Phe Glu 1665 1670 1675 1680		
Gly Arg Val Leu Glu Pro Leu Pro Val Thr Ala Trp Asp Val Arg Gln		

1685	1690	1695
Ala Pro Glu Ala Leu Arg His Leu Ser Gln Ala Arg His Val Gly Lys		
1700	1705	1710
Leu Val Leu Thr Met Pro Pro Val Trp Asp Ala Ala Gly Thr Val Leu		
1715	1720	1725
Val Thr Gly Gly Thr Gly Ala Leu Gly Ala Glu Val Ala Arg His Leu		
1730	1735	1740
Val Ile Glu Arg Gly Val Arg Asn Leu Val Leu Val Ser Arg Arg Gly		
1745	1750	1755
Pro Ala Ala Ser Gly Ala Ala Glu Leu Val Ala Gln Leu Thr Ala Tyr		
1765	1770	1775
Gly Ala Glu Val Ser Leu Gln Ala Cys Asp Val Ala Asp Arg Glu Thr		
1780	1785	1790
Leu Ala Lys Val Leu Ala Ser Ile Pro Asp Glu His Pro Leu Thr Ala		
1795	1800	1805
Val Val His Ala Ala Gly Val Leu Asp Asp Gly Val Ser Glu Ser Leu		
1810	1815	1820
Thr Val Glu Arg Leu Asp Gln Val Leu Arg Pro Lys Val Asp Gly Ala		
1825	1830	1835
Arg Asn Leu Leu Glu Leu Ile Asp Pro Asp Val Ala Leu Val Leu Phe		
1845	1850	1855
Ser Ser Val Ser Gly Val Leu Gly Ser Gly Gly Gln Gly Asn Tyr Ala		
1860	1865	1870
Ala Ala Asn Ser Phe Leu Asp Ala Leu Ala Gln Gln Arg Gln Ser Arg		
1875	1880	1885
Gly Leu Pro Thr Arg Ser Leu Ala Trp Gly Pro Trp Ala Glu His Gly		
1890	1895	1900
Met Ala Ser Thr Leu Arg Glu Ala Glu Gln Asp Arg Leu Ala Arg Ser		
1905	1910	1915
Gly Leu Leu Pro Ile Ser Thr Glu Glu Gly Leu Ser Gln Phe Asp Ala		
1925	1930	1935
Ala Cys Gly Gly Ala His Thr Val Val Ala Pro Val Arg Phe Ser Arg		
1940	1945	1950
Leu Ser Asp Gly Asn Ala Ile Lys Phe Ser Val Leu Gln Gly Leu Val		
1955	1960	1965
Gly Pro His Arg Val Asn Lys Ala Ala Thr Ala Asp Asp Ala Glu Ser		
1970	1975	1980
Leu Arg Lys Arg Leu Gly Arg Leu Pro Asp Ala Glu Gln His Arg Ile		

1985	1990	1995	2000
Leu Leu Asp Leu Val Arg Met His Val Ala Ala Val Leu Gly Phe Ala	2005	2010	2015
Gly Ser Gln Glu Ile Thr Ala Asp Gly Thr Phe Lys Val Leu Gly Phe	2020	2025	2030
Asp Ser Leu Thr Val Val Glu Leu Arg Asn Arg Ile Asn Gly Ala Thr	2035	2040	2045
Gly Leu Arg Leu Pro Ala Thr Leu Val Phe Asn Tyr Pro Thr Pro Asp	2050	2055	2060
Ala Leu Ala Ala His Leu Val Thr Ala Leu Ser Ala Asp Arg Leu Ala	2065	2070	2075
Gly Thr Phe Glu Glu Leu Asp Arg Trp Ala Ala Asn Leu Pro Thr Leu	2085	2090	2095
Ala Arg Asp Glu Ala Thr Arg Ala Gln Ile Thr Thr Arg Leu Gln Ala	2100	2105	2110
Ile Leu Gln Ser Leu Ala Asp Val Ser Gly Gly Thr Gly Gly Gly Ser	2115	2120	2125
Val Pro Asp Arg Leu Arg Ser Ala Thr Asp Asp Glu Leu Phe Gln Leu	2130	2135	2140
Leu Asp Asn Asp Leu Glu Leu Pro	2145	2150	

<210> 45
 <211> 9513
 <212> DNA
 <213> Saccharopolyspora spinosa

<220>
 <221> CDS
 <222> (1)..(9510)
 <223> ORF20; polyketide synthase

<400> 45	
atg tcg aat gaa gag aag ctc cgg gag tac ttg cgg cgt gcg ctc gtg	48
Met Ser Asn Glu Glu Lys Leu Arg Glu Tyr Leu Arg Arg Ala Leu Val	
1 5 10 15	
gat ctg cac cag gcg cgc gag cgg ctg cac gag gcg gag tcg gga gag	96
Asp Leu His Gln Ala Arg Glu Arg Leu His Glu Ala Glu Ser Gly Glu	
20 25 30	
cgg gaa ccc atc gcg atc gtg gcg atg ggc tgc cgg tac ccg ggt ggg	144
Arg Glu Pro Ile Ala Ile Val Ala Met Gly Cys Arg Tyr Pro Gly Gly	
35 40 45	

gtg cag gac ccg gaa ggg ctg tgg aaa ctg gtc gcc tcc ggt ggc gac	192
Val Gln Asp Pro Glu Gly Leu Trp Lys Leu Val Ala Ser Gly Gly Asp	
50 55 60	
gcc atc ggt gaa ttc ccc gct gat cgt ggt tgg cac ctc gac gag ctc	240
Ala Ile Gly Glu Phe Pro Ala Asp Arg Gly Trp His Leu Asp Glu Leu	
65 70 75 80	
tac gat ccc gac ccg gat cag ccc gga acc tgc tac acc cgg cac ggc	288
Tyr Asp Pro Asp Pro Asp Gln Pro Gly Thr Cys Tyr Thr Arg His Gly	
85 90 95	
ggc ttc ctc cac gac gcc ggc gag ttc gac gcg gga ttc ttc gac atc	336
Gly Phe Leu His Asp Ala Gly Glu Phe Asp Ala Gly Phe Phe Asp Ile	
100 105 110	
agc ccc cgt gag gcg ctc gcg atg gac ccg cag cag cgg ctg ctg ctg	384
Ser Pro Arg Glu Ala Leu Ala Met Asp Pro Gln Gln Arg Leu Leu Leu	
115 120 125	
gaa atc tcc tgg gag acc gtc gaa tcc gct ggg atg gac ccg agg tcc	432
Glu Ile Ser Trp Glu Thr Val Glu Ser Ala Gly Met Asp Pro Arg Ser	
130 135 140	
ttg cgg ggg agc cgc acc ggg gtg ttc gcg gga ttg atg tac gag ggc	480
Leu Arg Gly Ser Arg Thr Gly Val Phe Ala Gly Leu Met Tyr Glu Gly	
145 150 155 160	
tat gac acc ggc gcc cac cgg gca gga gaa ggt gtc gaa ggc tat ctc	528
Tyr Asp Thr Gly Ala His Arg Ala Gly Glu Gly Val Glu Gly Tyr Leu	
165 170 175	
gga acc ggc aat gcg gga agc gtc gcc tct ggt cgg gtt gcg tat gcg	576
Gly Thr Gly Asn Ala Gly Ser Val Ala Ser Gly Arg Val Ala Tyr Ala	
180 185 190	
ttc ggg ttc gag ggc cca gcg gtg acg gta gac acg gcg tgc tcg tcg	624
Phe Gly Phe Glu Gly Pro Ala Val Thr Val Asp Thr Ala Cys Ser Ser	
195 200 205	
tcg ttg gtg gcg ctg cat ttg gcg tgt cag tcg ttg cgg cag ggc gag	672
Ser Leu Val Ala Leu His Leu Ala Cys Gln Ser Leu Arg Gln Gly Glu	
210 215 220	
tgt gat ctg gcg ctg gcc ggt gga gtg acg gtg atg tcg acg ccg gag	720
Cys Asp Leu Ala Leu Ala Gly Gly Val Thr Val Met Ser Thr Pro Glu	
225 230 235 240	
agg ttc gtg gag ttc tcc cgt cag cgt ggt ctc gca ccg gat ggg cgg	768
Arg Phe Val Glu Phe Ser Arg Gln Arg Gly Leu Ala Pro Asp Gly Arg	
245 250 255	
tgt aag tcg ttc gcg gcg gct gcg gat gga acc ggt tgg ggt gag ggt	816
Cys Lys Ser Phe Ala Ala Ala Ala Asp Gly Thr Gly Trp Gly Glu Gly	
260 265 270	
gcc ggt ttg gtg ttg ctg gag cgg ctg tca gac gcc agg cgg aac ggg	864

Ala	Gly	Leu	Val	Leu	Leu	Glu	Arg	Leu	Ser	Asp	Ala	Arg	Arg	Asn	Gly		
		275					280					285					
cat	cgg	gta	ctg	gcg	gtt	gtt	cgt	ggg	agc	gcg	gtg	aat	cag	gac	ggg	912	
His	Arg	Val	Leu	Ala	Val	Val	Arg	Gly	Ser	Ala	Val	Asn	Gln	Asp	Gly		
		290				295					300						
gcg	tcg	aac	gga	ttg	acg	gcc	ccg	aac	ggg	ctg	gcc	cag	gag	cgg	gtc	960	
Ala	Ser	Asn	Gly	Leu	Thr	Ala	Pro	Asn	Gly	Leu	Ala	Gln	Glu	Arg	Val		
305					310					315					320		
att	cag	cag	gtg	ctc	acg	agt	gcg	ggg	ctg	tcg	gcg	tcc	gat	gtg	gac	1008	
Ile	Gln	Gln	Val	Leu	Thr	Ser	Ala	Gly	Leu	Ser	Ala	Ser	Asp	Val	Asp		
				325					330					335			
gct	gtg	gag	gcg	cat	gga	acg	ggg	acg	cgg	ctt	ggg	gat	ccg	atc	gag	1056	
Ala	Val	Glu	Ala	His	Gly	Thr	Gly	Thr	Arg	Leu	Gly	Asp	Pro	Ile	Glu		
			340					345					350				
gcg	cag	gct	ctg	ata	gcc	gcc	tat	gga	cag	gat	cgg	gac	cgg	gac	cgg	1104	
Ala	Gln	Ala	Leu	Ile	Ala	Ala	Tyr	Gly	Gln	Asp	Arg	Asp	Arg	Asp	Arg		
		355					360					365					
ccg	ctg	tgg	ttg	ggg	tcg	gtc	aag	tcc	aac	atc	ggg	cat	acg	cag	gcg	1152	
Pro	Leu	Trp	Leu	Gly	Ser	Val	Lys	Ser	Asn	Ile	Gly	His	Thr	Gln	Ala		
		370				375					380						
gct	gcg	ggc	gtc	gct	ggg	gtg	atc	aag	atg	gtc	atg	gcg	atg	cgg	cac	1200	
Ala	Ala	Gly	Val	Ala	Gly	Val	Ile	Lys	Met	Val	Met	Ala	Met	Arg	His		
385					390					395					400		
ggg	gag	ctg	ccg	cgc	acg	ttg	cac	gtg	gac	gag	ccg	aat	tcg	cac	gtg	1248	
Gly	Glu	Leu	Pro	Arg	Thr	Leu	His	Val	Asp	Glu	Pro	Asn	Ser	His	Val		
				405					410					415			
gac	tgg	tcg	gct	ggg	gcg	gtc	cga	ctc	ctg	acc	gag	aac	atc	cgc	tgg	1296	
Asp	Trp	Ser	Ala	Gly	Ala	Val	Arg	Leu	Leu	Thr	Glu	Asn	Ile	Arg	Trp		
			420					425					430				
cca	ggg	acg	ggg	acg	cgc	cgc	gct	gga	gtg	tcg	tcg	ttc	ggg	gta	agc	1344	
Pro	Gly	Thr	Gly	Thr	Arg	Arg	Ala	Gly	Val	Ser	Ser	Phe	Gly	Val	Ser		
		435					440					445					
ggg	acc	aac	gca	cac	gtc	atc	ctc	gaa	cac	gac	ccg	ctc	gcc	gtg	acc	1392	
Gly	Thr	Asn	Ala	His	Val	Ile	Leu	Glu	His	Asp	Pro	Leu	Ala	Val	Thr		
		450				455					460						
gag	aac	gag	gaa	gca	gcg	cag	tcc	cca	gca	cct	ggg	atc	gtg	ccc	tgg	1440	
Glu	Asn	Glu	Glu	Ala	Ala	Gln	Ser	Pro	Ala	Pro	Gly	Ile	Val	Pro	Trp		
465					470					475					480		
gcg	ttg	tcc	ggg	cgg	tcg	tcg	acg	gcg	ctg	cgg	gcc	cag	gcc	gaa	cgg	1488	
Ala	Leu	Ser	Gly	Arg	Ser	Ser	Thr	Ala	Leu	Arg	Ala	Gln	Ala	Glu	Arg		
				485					490					495			
ctg	cgc	gag	ctg	tgc	gag	cag	acc	gat	ccc	gac	ccc	gtc	gat	gtc	ggg	1536	
Leu	Arg	Glu	Leu	Cys	Glu	Gln	Thr	Asp	Pro	Asp	Pro	Val	Asp	Val	Gly		

500						505						510						
ttc	tca	ctg	gcc	gcc	acg	cgc	acg	gct	tgg	gag	cac	cga	gcg	gtg	gtg	1584		
Phe	Ser	Leu	Ala	Ala	Thr	Arg	Thr	Ala	Trp	Glu	His	Arg	Ala	Val	Val			
		515						520					525					
ctt	ggg	cgg	gac	agc	gct	acg	ttg	cgc	tcc	ggg	ctt	ggc	gtt	gtt	gcc	1632		
Leu	Gly	Arg	Asp	Ser	Ala	Thr	Leu	Arg	Ser	Gly	Leu	Gly	Val	Val	Ala			
	530						535				540							
agc	ggg	gaa	cca	gcg	gtc	gat	gtc	gtt	gag	ggg	agc	gtc	ctg	gac	ggc	1680		
Ser	Gly	Glu	Pro	Ala	Val	Asp	Val	Val	Glu	Gly	Ser	Val	Leu	Asp	Gly			
545					550					555					560			
gag	gtc	gtc	ttc	gtc	ttc	ccc	ggg	cag	ggc	tgg	cag	tgg	gcc	ggg	atg	1728		
Glu	Val	Val	Phe	Val	Phe	Pro	Gly	Gln	Gly	Trp	Gln	Trp	Ala	Gly	Met			
			565					570						575				
gca	gtc	gac	ctg	ctg	gac	gct	tcg	ccg	acg	ttc	gcg	cgc	cac	atg	gac	1776		
Ala	Val	Asp	Leu	Leu	Asp	Ala	Ser	Pro	Thr	Phe	Ala	Arg	His	Met	Asp			
			580					585					590					
gag	tgc	gcc	acc	gcg	ctg	cgg	agg	tac	gtg	gac	tgg	tcg	ttg	gtc	gac	1824		
Glu	Cys	Ala	Thr	Ala	Leu	Arg	Arg	Tyr	Val	Asp	Trp	Ser	Leu	Val	Asp			
		595					600					605						
gtg	ctg	cgc	gga	gcg	gag	aac	tcc	cca	ccg	ctg	gac	cgg	gtg	gac	gtg	1872		
Val	Leu	Arg	Gly	Ala	Glu	Asn	Ser	Pro	Pro	Leu	Asp	Arg	Val	Asp	Val			
	610					615					620							
ctc	cag	ccc	gcg	tcc	ttc	gcg	gtg	atg	gtg	tcg	ctc	gcc	gag	gtg	tgg	1920		
Leu	Gln	Pro	Ala	Ser	Phe	Ala	Val	Met	Val	Ser	Leu	Ala	Glu	Val	Trp			
625					630					635					640			
cgt	tcc	tac	ggg	gtg	agg	ccg	gcg	gcc	gtc	gtc	ggc	cac	agt	caa	ggc	1968		
Arg	Ser	Tyr	Gly	Val	Arg	Pro	Ala	Ala	Val	Val	Gly	His	Ser	Gln	Gly			
			645					650					655					
gaa	atc	gcc	gcg	gcc	tgc	gca	gcc	ggg	gtg	ctg	ccg	ctg	gag	gat	gcg	2016		
Glu	Ile	Ala	Ala	Ala	Cys	Ala	Ala	Gly	Val	Leu	Pro	Leu	Glu	Asp	Ala			
		660					665					670						
gcc	agg	ctt	gtc	gca	ttg	cgc	agc	aga	gcg	ttg	aag	gga	ctt	tcg	ggg	2064		
Ala	Arg	Leu	Val	Ala	Leu	Arg	Ser	Arg	Ala	Leu	Lys	Gly	Leu	Ser	Gly			
		675					680					685						
cgg	ggg	ggc	atg	gcg	tcg	ctg	gcc	tgc	cct	gcg	gat	gag	gtc	gcg	gca	2112		
Arg	Gly	Gly	Met	Ala	Ser	Leu	Ala	Cys	Pro	Ala	Asp	Glu	Val	Ala	Ala			
	690					695					700							
ttg	ttc	gcg	gga	tcg	ggc	ggc	cgt	ctg	gaa	gtt	gcg	gcg	atc	aac	ggc	2160		
Leu	Phe	Ala	Gly	Ser	Gly	Gly	Arg	Leu	Glu	Val	Ala	Ala	Ile	Asn	Gly			
705					710					715					720			
ccg	cga	tcg	gtc	gtg	gtg	tcc	ggc	gat	ctg	gaa	gcg	gtg	gac	gaa	ctg	2208		
Pro	Arg	Ser	Val	Val	Val	Ser	Gly	Asp	Leu	Glu	Ala	Val	Asp	Glu	Leu			
			725						730					735				

ctg gca gag tgc gct gaa aag gac atg cgt gca cgc cgt atc ccc gtc	2256
Leu Ala Glu Cys Ala Glu Lys Asp Met Arg Ala Arg Arg Ile Pro Val	
740 745 750	
gac tac gcc tcg cat tca gcg cac gtg gag gtg gtt cgg agc ccg gtg	2304
Asp Tyr Ala Ser His Ser Ala His Val Glu Val Val Arg Ser Pro Val	
755 760 765	
ctg gcg gcc gcc gcc ggg gtg cga cac cgg gac ggc cag gtg ccg tgg	2352
Leu Ala Ala Ala Ala Gly Val Arg His Arg Asp Gly Gln Val Pro Trp	
770 775 780	
tgg tcg acg gtg atc ggc gac tgg gtg gat ccg gcc agg ctg gac ggc	2400
Trp Ser Thr Val Ile Gly Asp Trp Val Asp Pro Ala Arg Leu Asp Gly	
785 790 795 800	
gag tat tgg tat cgg aac ctc cgg cag ccg gtc cgg ttc gaa cac gcc	2448
Glu Tyr Trp Tyr Arg Asn Leu Arg Gln Pro Val Arg Phe Glu His Ala	
805 810 815	
gtg cag ggc ctg gtc gag cgg gga ttc ggc ctg ttc atc gaa atg agt	2496
Val Gln Gly Leu Val Glu Arg Gly Phe Gly Leu Phe Ile Glu Met Ser	
820 825 830	
gcg cat ccg gtg ctg acc acg gcg gtc gag gaa acc ggt gcg gag tcg	2544
Ala His Pro Val Leu Thr Thr Ala Val Glu Glu Thr Gly Ala Glu Ser	
835 840 845	
gag acc gcc gtg gcc gcg gta ggt acc ttg cga cgt gac tcg ggc ggc	2592
Glu Thr Ala Val Ala Ala Val Gly Thr Leu Arg Arg Asp Ser Gly Gly	
850 855 860	
ctc cgg agg ttg ttg cat tcg ctg gcc gag gcg tac gtg cgc ggc gcc	2640
Leu Arg Arg Leu Leu His Ser Leu Ala Glu Ala Tyr Val Arg Gly Ala	
865 870 875 880	
acc gtg gac tgg gcc gtg gcg ttc ggg ggc gcg ggc cga cgg ctg gac	2688
Thr Val Asp Trp Ala Val Ala Phe Gly Gly Ala Gly Arg Arg Leu Asp	
885 890 895	
ctg ccg acc tac ccg ttc cag cgc cag cgg tac tgg ctg gac aag gga	2736
Leu Pro Thr Tyr Pro Phe Gln Arg Gln Arg Tyr Trp Leu Asp Lys Gly	
900 905 910	
gct gcc tcc gac gag gct cgt gcg gtc tcg gac ccg gcg gcg ggc tgg	2784
Ala Ala Ser Asp Glu Ala Arg Ala Val Ser Asp Pro Ala Ala Gly Trp	
915 920 925	
ttc tgg caa gcc gtg gcg cgc caa gac ctg aaa agc gtg tcc gat gcc	2832
Phe Trp Gln Ala Val Ala Arg Gln Asp Leu Lys Ser Val Ser Asp Ala	
930 935 940	
ctc gat ctc gac gcc gac gca ccg ctg agc gca aca ctt cca gcc ctg	2880
Leu Asp Leu Asp Ala Asp Ala Pro Leu Ser Ala Thr Leu Pro Ala Leu	
945 950 955 960	

tcc gtc tgg cac cgt cag gaa cga gaa agg gtc ttg gca gac ggt tgg	2928
Ser Val Trp His Arg Gln Glu Arg Glu Arg Val Leu Ala Asp Gly Trp	
965 970 975	
cgg tac cga gtc gac tgg gta cgg gtg gcc ccg cag ccg gtc cgg aga	2976
Arg Tyr Arg Val Asp Trp Val Arg Val Ala Pro Gln Pro Val Arg Arg	
980 985 990	
acg cgg gaa acc tgg ctc ctg gtc gtt ccc ccg ggc ggc atc gag gaa	3024
Thr Arg Glu Thr Trp Leu Leu Val Val Pro Pro Gly Gly Ile Glu Glu	
995 1000 1005	
gcg ctg gtc gaa cgg ctg acg gat gcg ttg aac acg cga ggg atc agc	3072
Ala Leu Val Glu Arg Leu Thr Asp Ala Leu Asn Thr Arg Gly Ile Ser	
1010 1015 1020	
acc ctg cgc ctc gac gtg cca ccg gcg gcg acc agt ggc gaa ctc gca	3120
Thr Leu Arg Leu Asp Val Pro Pro Ala Ala Thr Ser Gly Glu Leu Ala	
1025 1030 1035 1040	
acc gaa ctc cgc gcc gca gcc gac ggt gac ccg gtg aag gca atc ctg	3168
Thr Glu Leu Arg Ala Ala Ala Asp Gly Asp Pro Val Lys Ala Ile Leu	
1045 1050 1055	
tcg ctc acc gcg ttg gac gag cga ccc cac ccc gaa tgc aag gac gtc	3216
Ser Leu Thr Ala Leu Asp Glu Arg Pro His Pro Glu Cys Lys Asp Val	
1060 1065 1070	
ccg agc ggg att gcc ttg ctg ctg aac ctg gtc aag gcg ctc ggt gaa	3264
Pro Ser Gly Ile Ala Leu Leu Leu Asn Leu Val Lys Ala Leu Gly Glu	
1075 1080 1085	
gcc gac ctc aga att cct ctg tgg acc atc acg cgt ggt gcg gtc aag	3312
Ala Asp Leu Arg Ile Pro Leu Trp Thr Ile Thr Arg Gly Ala Val Lys	
1090 1095 1100	
gca ggc ccc gca gat cgg ctg ctg cgc ccg atg cag gcg caa gca tgg	3360
Ala Gly Pro Ala Asp Arg Leu Leu Arg Pro Met Gln Ala Gln Ala Trp	
1105 1110 1115 1120	
ggg ctg ggg cga gta gcc gca ctc gaa cac ccc gag cgc tgg ggt ggg	3408
Gly Leu Gly Arg Val Ala Ala Leu Glu His Pro Glu Arg Trp Gly Gly	
1125 1130 1135	
ctg atc gac ctg ccg gat tcg ctg gac ggc gac gtc ctc acg agg ctg	3456
Leu Ile Asp Leu Pro Asp Ser Leu Asp Gly Asp Val Leu Thr Arg Leu	
1140 1145 1150	
ggc gaa gcg ctc acc aac ggc ttg gcg gaa gac caa ctg gcg att cgc	3504
Gly Glu Ala Leu Thr Asn Gly Leu Ala Glu Asp Gln Leu Ala Ile Arg	
1155 1160 1165	
cag tcg ggc gtg ctg gcc cgg cga ctg gta ccc gcc ccg gcg aat cag	3552
Gln Ser Gly Val Leu Ala Arg Arg Leu Val Pro Ala Pro Ala Asn Gln	
1170 1175 1180	
ccc gct gga cgt aag tgg cgc ccc cga ggg agc gcg ctg atc acg ggc	3600

Pro	Ala	Gly	Arg	Lys	Trp	Arg	Pro	Arg	Gly	Ser	Ala	Leu	Ile	Thr	Gly	
1185					1190					1195					1200	
gga	ctc	ggc	gcg	gtg	ggc	gca	cag	gtg	gcg	agg	tgg	ttg	gcc	gaa	atc	3648
Gly	Leu	Gly	Ala	Val	Gly	Ala	Gln	Val	Ala	Arg	Trp	Leu	Ala	Glu	Ile	
				1205					1210					1215		
gga	gcc	gag	cga	atc	gtg	ctc	acc	agt	cga	cgg	ggc	aac	caa	gca	gca	3696
Gly	Ala	Glu	Arg	Ile	Val	Leu	Thr	Ser	Arg	Arg	Gly	Asn	Gln	Ala	Ala	
			1220					1225					1230			
ggc	gcc	gcc	gag	ctg	gaa	gcc	gaa	ctc	cgg	gcc	ctt	gga	gcg	caa	gtg	3744
Gly	Ala	Ala	Glu	Leu	Glu	Ala	Glu	Leu	Arg	Ala	Leu	Gly	Ala	Gln	Val	
		1235					1240					1245				
tcc	atc	gtg	gct	tgc	gac	gtg	acc	gat	cgt	gcc	gag	atg	tcc	gca	cta	3792
Ser	Ile	Val	Ala	Cys	Asp	Val	Thr	Asp	Arg	Ala	Glu	Met	Ser	Ala	Leu	
	1250					1255					1260					
ctg	gcc	gag	ttc	gac	gtc	acc	gcg	gtg	ttc	cac	gcg	gcc	gga	gtc	ggc	3840
Leu	Ala	Glu	Phe	Asp	Val	Thr	Ala	Val	Phe	His	Ala	Ala	Gly	Val	Gly	
1265					1270					1275					1280	
cgg	ctg	ctg	ccg	ttg	gcg	gag	acc	gac	cag	aac	ggc	ctg	gcc	gaa	ata	3888
Arg	Leu	Leu	Pro	Leu	Ala	Glu	Thr	Asp	Gln	Asn	Gly	Leu	Ala	Glu	Ile	
			1285						1290					1295		
tgc	gcg	gcg	aag	gtc	cgc	ggc	gct	cag	gtg	ctg	gac	gaa	ctg	tgc	gac	3936
Cys	Ala	Ala	Lys	Val	Arg	Gly	Ala	Gln	Val	Leu	Asp	Glu	Leu	Cys	Asp	
		1300						1305					1310			
agc	acc	gat	ctc	gat	gcc	ttc	gtc	ctg	ttc	tcc	tcc	ggc	ggg	gta		3984
Ser	Thr	Asp	Leu	Asp	Ala	Phe	Val	Leu	Phe	Ser	Ser	Gly	Ala	Gly	Val	
		1315					1320					1325				
tgg	ggc	ggg	ggc	ggc	cag	ggc	gct	tac	ggc	gcg	gcg	aac	gca	ttc	ttg	4032
Trp	Gly	Gly	Gly	Gly	Gln	Gly	Ala	Tyr	Gly	Ala	Ala	Asn	Ala	Phe	Leu	
	1330					1335				1340						
gac	aca	ctc	gcc	gaa	caa	cgc	cga	gca	cgc	ggc	ctg	ccg	gca	acc	tcc	4080
Asp	Thr	Leu	Ala	Glu	Gln	Arg	Arg	Ala	Arg	Gly	Leu	Pro	Ala	Thr	Ser	
1345				1350					1355						1360	
atc	tcc	tgg	ggc	agt	tgg	gcc	ggc	ggc	ggc	atg	gcc	gac	ggc	gcg	gcg	4128
Ile	Ser	Trp	Gly	Ser	Trp	Ala	Gly	Gly	Gly	Met	Ala	Asp	Gly	Ala	Ala	
			1365					1370					1375			
ggc	gaa	cac	ctg	cgg	cga	cgc	ggg	ata	cgt	ccg	atg	ccg	gcg	gcg	tcc	4176
Gly	Glu	His	Leu	Arg	Arg	Arg	Gly	Ile	Arg	Pro	Met	Pro	Ala	Ala	Ser	
		1380					1385					1390				
gcc	atc	ctg	gct	ctg	cag	gaa	gta	ctt	gac	cag	gat	gag				

1410	1415	1420	
act cgc gcc acc cgg ttg ttc gac gaa gtg ccg gcg gcg aga aag gcg			4320
Thr Arg Ala Thr Arg Leu Phe Asp Glu Val Pro Ala Ala Arg Lys Ala			
1425	1430	1435	1440
atg ccc gcg aat ggg ccg gca gaa cca ggc ggc tcg ccg ttc gcc cgc			4368
Met Pro Ala Asn Gly Pro Ala Glu Pro Gly Gly Ser Pro Phe Ala Arg			
1445	1450	1455	
aat ctc gcg gag ctg ccg gaa gcc caa cga cgc cac gaa ctg gtg gat			4416
Asn Leu Ala Glu Leu Pro Glu Ala Gln Arg Arg His Glu Leu Val Asp			
1460	1465	1470	
ctg gtg tgc gcc cag gtg gca acc gtg ctc ggg cac ggc agt cgc gag			4464
Leu Val Cys Ala Gln Val Ala Thr Val Leu Gly His Gly Ser Arg Glu			
1475	1480	1485	
gaa gtc cag ccc gag ccg gcg ttc cgc gcg ctc ggg ttc gac tcc ctc			4512
Glu Val Gln Pro Glu Arg Ala Phe Arg Ala Leu Gly Phe Asp Ser Leu			
1490	1495	1500	
atg gcg gtg gat ctg cgc aat cgt ttg acc acc gcc acc ggg ttg cgc			4560
Met Ala Val Asp Leu Arg Asn Arg Leu Thr Thr Ala Thr Gly Leu Arg			
1505	1510	1515	1520
ctg ccg acc aca acc gtc ttc gac tac ccg aat ccg gcc gcc ttg gcc			4608
Leu Pro Thr Thr Thr Val Phe Asp Tyr Pro Asn Pro Ala Ala Leu Ala			
1525	1530	1535	
gct cac ctg ctc gag gag ctg gtg ggt gat gtc gcg tcg gct gcg gtg			4656
Ala His Leu Leu Glu Glu Leu Val Gly Asp Val Ala Ser Ala Ala Val			
1540	1545	1550	
acc gct gcc agc gcg ccc gcg agt gac gaa ccg atc gcg atc gtc gcg			4704
Thr Ala Ala Ser Ala Pro Ala Ser Asp Glu Pro Ile Ala Ile Val Ala			
1555	1560	1565	
atg agc tgc ccg ttt ccg ggt ggc gcg cac tcg ccg gaa gac ctg tgg			4752
Met Ser Cys Arg Phe Pro Gly Gly Ala His Ser Pro Glu Asp Leu Trp			
1570	1575	1580	
ccg ctg gtc gcc gcc ggc acg gag gtg atc ggc gag ttc ccc tcc gac			4800
Arg Leu Val Ala Ala Gly Thr Glu Val Ile Gly Glu Phe Pro Ser Asp			
1585	1590	1595	1600
ccg ggc tgg gat gcg gaa ggc ctt tac gat ccg gat gct tcc agg cct			4848
Arg Gly Trp Asp Ala Glu Gly Leu Tyr Asp Pro Asp Ala Ser Arg Pro			
1605	1610	1615	
gga acg acg tat gcg ccg atg gcg gga ttc ctc tac gac gcc ggt gag			4896
Gly Thr Thr Tyr Ala Arg Met Ala Gly Phe Leu Tyr Asp Ala Gly Glu			
1620	1625	1630	
ttc gat gcc gac ctg ttc ggc atc agc cca cgt gag gcg ttg gcg atg			4944
Phe Asp Ala Asp Leu Phe Gly Ile Ser Pro Arg Glu Ala Leu Ala Met			
1635	1640	1645	

gat ccg cag cag cgg ttg gtg ctc gaa atc gcc tgg gaa gcc ctc gaa	4992
Asp Pro Gln Gln Arg Leu Val Leu Glu Ile Ala Trp Glu Ala Leu Glu	
1650 1655 1660	
cgg gcc gga atc gat ccg ttg tcc ttg aag ggc agt ggg gtc ggc acg	5040
Arg Ala Gly Ile Asp Pro Leu Ser Leu Lys Gly Ser Gly Val Gly Thr	
1665 1670 1675 1680	
tac atc ggc gct gga agc cgt ggg tac gcg acg gat gtg cgg cag ttt	5088
Tyr Ile Gly Ala Gly Ser Arg Gly Tyr Ala Thr Asp Val Arg Gln Phe	
1685 1690 1695	
ccc gag gag gcg gag ggc tac ctg ctg acg ggt acc tcg gcc agt gtg	5136
Pro Glu Glu Ala Glu Gly Tyr Leu Leu Thr Gly Thr Ser Ala Ser Val	
1700 1705 1710	
ctg tcg ggt cgg gtc gcg tat tcg ttt ggt ttc gag ggt cct gcg gtg	5184
Leu Ser Gly Arg Val Ala Tyr Ser Phe Gly Phe Glu Gly Pro Ala Val	
1715 1720 1725	
acg gtg gat acg gct tgt tcg tcg tcg ttg gtg gcg ttg cat ctg gcg	5232
Thr Val Asp Thr Ala Cys Ser Ser Ser Leu Val Ala Leu His Leu Ala	
1730 1735 1740	
tgc cag tcg ttg cgt tcg ggc gag tgt gat ctg gcg ttg gcc ggt ggt	5280
Cys Gln Ser Leu Arg Ser Gly Glu Cys Asp Leu Ala Leu Ala Gly Gly	
1745 1750 1755 1760	
gtg acc gtg atg tcg acg ccg gag atg ttc gtg gag ttc tcc cgt cag	5328
Val Thr Val Met Ser Thr Pro Glu Met Phe Val Glu Phe Ser Arg Gln	
1765 1770 1775	
cgc ggt ttg gcg ccg gat ggg cgg tgc aag tcg ttc gcg gag agc gcg	5376
Arg Gly Leu Ala Pro Asp Gly Arg Cys Lys Ser Phe Ala Glu Ser Ala	
1780 1785 1790	
gac ggc acc ggc tgg ggc gaa ggc gcg ggc ctg ttg ttg ctg gag cgg	5424
Asp Gly Thr Gly Trp Gly Glu Ala Gly Leu Leu Leu Leu Glu Arg	
1795 1800 1805	
ttg tcg gac gcc cac cgg aat ggg cat cgg gtg ttg gcg gtg gtt cgt	5472
Leu Ser Asp Ala His Arg Asn Gly His Arg Val Leu Ala Val Val Arg	
1810 1815 1820	
ggg tca gcg gtg aat cag gac ggc gcc tcg aac gga ctg gcg gcg ccg	5520
Gly Ser Ala Val Asn Gln Asp Gly Ala Ser Asn Gly Leu Ala Ala Pro	
1825 1830 1835 1840	
aac ggt ccg tcg cag cag cgg gtg atc aac cag gca ctc gcg aat gcg	5568
Asn Gly Pro Ser Gln Gln Arg Val Ile Asn Gln Ala Leu Ala Asn Ala	
1845 1850 1855	
gct ctt tcg gcg tcc gat gtg gat gcg gtg gag gca cat ggc acc ggg	5616
Ala Leu Ser Ala Ser Asp Val Asp Ala Val Glu Ala His Gly Thr Gly	
1860 1865 1870	

acc agg ctg ggt gat ccg atc gag gcg cag gca ttg atc gca acg tat	5664
Thr Arg Leu Gly Asp Pro Ile Glu Ala Gln Ala Leu Ile Ala Thr Tyr	
1875 1880 1885	
ggg cag gcc cgg gag cgg gat cgg ccc ttg tgg ctg ggg tcg gtc aag	5712
Gly Gln Ala Arg Glu Arg Asp Arg Pro Leu Trp Leu Gly Ser Val Lys	
1890 1895 1900	
tcg aac atc ggt cat acg cag gcc gcg gcg ggt gtt gcc ggt gtg atc	5760
Ser Asn Ile Gly His Thr Gln Ala Ala Ala Gly Val Ala Gly Val Ile	
1905 1910 1915 1920	
aag atg gtg atg gcc atg cgg cac ggg cag ctg ccc gcc tcg ctg cac	5808
Lys Met Val Met Ala Met Arg His Gly Gln Leu Pro Ala Ser Leu His	
1925 1930 1935	
gcg gat gag ccc acg tcg gag gtc gat tgg tcg tcg ggg gcg gtc cgg	5856
Ala Asp Glu Pro Thr Ser Glu Val Asp Trp Ser Ser Gly Ala Val Arg	
1940 1945 1950	
ctc ctc gcc gaa cag gta cct tgg ccg gag tct gac cgt gtt cgt cgg	5904
Leu Leu Ala Glu Gln Val Pro Trp Pro Glu Ser Asp Arg Val Arg Arg	
1955 1960 1965	
gtg ggg gtt tcg tcg ttc ggg atc agc ggc acc aac gca cat gtg atc	5952
Val Gly Val Ser Ser Phe Gly Ile Ser Gly Thr Asn Ala His Val Ile	
1970 1975 1980	
ctc gaa caa gct acg aat gcg cca gat agt aca gcg gag acg gac aaa	6000
Leu Glu Gln Ala Thr Asn Ala Pro Asp Ser Thr Ala Glu Thr Asp Lys	
1985 1990 1995 2000	
aca gaa tcc gga tct act gtc gat att ccg gtc gtt ccc tgg ttg gtg	6048
Thr Glu Ser Gly Ser Thr Val Asp Ile Pro Val Val Pro Trp Leu Val	
2005 2010 2015	
tcg gga aag acg acg gat tcc ctg cgg gga caa gcc gaa cga gtc ttg	6096
Ser Gly Lys Thr Thr Asp Ser Leu Arg Gly Gln Ala Glu Arg Val Leu	
2020 2025 2030	
tct cag gtc gag tcc cgg ccg gag cag cgt tcg ctg gat gtt gcc tac	6144
Ser Gln Val Glu Ser Arg Pro Glu Gln Arg Ser Leu Asp Val Ala Tyr	
2035 2040 2045	
tcg ctt gct tct ggc cga gcc gcg ctg gat gaa cgc gct gtc gtg ctg	6192
Ser Leu Ala Ser Gly Arg Ala Ala Leu Asp Glu Arg Ala Val Val Leu	
2050 2055 2060	
ggt gcg gac cgc ggt gag ctg gtt gct gga ctg gcg gcg ttg gcc gcc	6240
Gly Ala Asp Arg Gly Glu Leu Val Ala Gly Leu Ala Ala Leu Ala Ala	
2065 2070 2075 2080	
ggt cag gag gct tct ggg gtg atc agc gga act cgt gct tct gct cgg	6288
Gly Gln Glu Ala Ser Gly Val Ile Ser Gly Thr Arg Ala Ser Ala Arg	
2085 2090 2095	
ttc ggg ttc gtg ttc tcg ggg cag ggt ggt cag tgg ttg ggg atg ggc	6336

Phe Gly Phe Val Phe Ser Gly Gln Gly Gly Gln Trp Leu Gly Met Gly	
2100 2105 2110	
aga gcg ctc tac tcg aag ttt ccg gtg ttc gct gct gcg ttt gat gag	6384
Arg Ala Leu Tyr Ser Lys Phe Pro Val Phe Ala Ala Phe Asp Glu	
2115 2120 2125	
gct tgc gcc gag ttg gag gca cat ctg ggg gaa gac cgc cgg gtt cgg	6432
Ala Cys Ala Glu Leu Glu Ala His Leu Gly Glu Asp Arg Arg Val Arg	
2130 2135 2140	
gat gtg gtc ttc ggt tcc gat gcg cag ctg ctg gat cag acg ctg tgg	6480
Asp Val Val Phe Gly Ser Asp Ala Gln Leu Leu Asp Gln Thr Leu Trp	
2145 2150 2155 2160	
gcg cag tcg ggt ctg ttc gcg ctg caa gcc ggc ctc ttg ggg ctg ctg	6528
Ala Gln Ser Gly Leu Phe Ala Leu Gln Ala Gly Leu Leu Gly Leu Leu	
2165 2170 2175	
ggt tcg tgg ggc gtt cgg ccg gat gtg gtg atg ggg cat tcg gtc ggg	6576
Gly Ser Trp Gly Val Arg Pro Asp Val Val Met Gly His Ser Val Gly	
2180 2185 2190	
gag ttg gcc gcc gcg ttt gcg gct ggc gtg ttg tcg ttg cgg gat gcg	6624
Glu Leu Ala Ala Phe Ala Ala Gly Val Leu Ser Leu Arg Asp Ala	
2195 2200 2205	
gct cgg ttg gtg gcc gcg cgc gcc cgg ttg atg caa gcc ctg ccc tct	6672
Ala Arg Leu Val Ala Ala Arg Ala Arg Leu Met Gln Ala Leu Pro Ser	
2210 2215 2220	
gac ggc gcg atg ttg gcg gtg gct gct ggt gaa gac ctt gtt cgg cca	6720
Asp Gly Ala Met Leu Ala Val Ala Ala Gly Glu Asp Leu Val Arg Pro	
2225 2230 2235 2240	
ttg ctg gcc ggt cgg gag gag tcc gtg agc gtc gcc gcg ctc aat gcc	6768
Leu Leu Ala Gly Arg Glu Glu Ser Val Ser Val Ala Ala Leu Asn Ala	
2245 2250 2255	
ccc ggt tcg gtg gtg ttg tcg ggc gat cgg gag gtg ctg gcc agc atc	6816
Pro Gly Ser Val Val Leu Ser Gly Asp Arg Glu Val Leu Ala Ser Ile	
2260 2265 2270	
gtc ggc cgg ctg acc gag ctc cga gtc cgg acg cgg cgc ttg cgg gtc	6864
Val Gly Arg Leu Thr Glu Leu Arg Val Arg Thr Arg Arg Leu Arg Val	
2275 2280 2285	
tcc cat gct ttt cat tcg cac cgg atg gac ccg atg ttg ggc gag ttc	6912
Ser His Ala Phe His Ser His Arg Met Asp Pro Met Leu Gly Glu Phe	
2290 2295 2300	
gcc cag atc gcc gag tct gcg gag ttc ggt aag cca acg aca ccg ctt	6960
Ala Gln Ile Ala Glu Ser Ala Glu Phe Gly Lys Pro Thr Thr Pro Leu	
2305 2310 2315 2320	
gtg tcg acg ttg acg ggt gag ctc gac aga gcc gcg gaa atg agc aca	7008
Val Ser Thr Leu Thr Gly Glu Leu Asp Arg Ala Ala Glu Met Ser Thr	

cca ggg tat tgg gtg cgc cag gcg cgt gaa ccc gtc cgt ttc gcc gac	7056
Pro Gly Tyr Trp Val Arg Gln Ala Arg Glu Pro Val Arg Phe Ala Asp	
2340 2345 2350	
ggt gtc cag gcc ctg gca gcg cag ggc ata ggc acg gtc gtc gag ctc	7104
Gly Val Gln Ala Leu Ala Ala Gln Gly Ile Gly Thr Val Val Glu Leu	
2355 2360 2365	
ggc ccg gac gga acg ctg gcg gca ctg gtt cgg gag tgt gcg acc gag	7152
Gly Pro Asp Gly Thr Leu Ala Ala Leu Val Arg Glu Cys Ala Thr Glu	
2370 2375 2380	
tcc gat cgg gtt ggg cgg att tcg tcg atc cca ctg atg cgc agg gag	7200
Ser Asp Arg Val Gly Arg Ile Ser Ser Ile Pro Leu Met Arg Arg Glu	
2385 2390 2395 2400	
cgg gac gag acc cgt tcg gtg atg aca gcc ctg gcg cat ctc cac acc	7248
Arg Asp Glu Thr Arg Ser Val Met Thr Ala Leu Ala His Leu His Thr	
2405 2410 2415	
cgt ggt ggt gag gtg gac tgg cag gcg ttt ttc gcc ggt acc ggc gct	7296
Arg Gly Gly Glu Val Asp Trp Gln Ala Phe Phe Ala Gly Thr Gly Ala	
2420 2425 2430	
agg cag ctc gag ttg cca acg tat gcc ttc caa cga cag cac tac tgg	7344
Arg Gln Leu Glu Leu Pro Thr Tyr Ala Phe Gln Arg Gln His Tyr Trp	
2435 2440 2445	
atc gag tcc agt gcg cgg cca gca cgc gac cgc gca gac atc ggc gag	7392
Ile Glu Ser Ser Ala Arg Pro Ala Arg Asp Arg Ala Asp Ile Gly Glu	
2450 2455 2460	
gtg gcg gaa cag ttc tgg acc gcg gtt gac caa ggc gat ctg gca acg	7440
Val Ala Glu Gln Phe Trp Thr Ala Val Asp Gln Gly Asp Leu Ala Thr	
2465 2470 2475 2480	
ttg gtc gcc gct ctg gat ctt ggg gcg gac gac gac aca tgc gca tcg	7488
Leu Val Ala Ala Leu Asp Leu Gly Ala Asp Asp Asp Thr Cys Ala Ser	
2485 2490 2495	
ttg agc gat gta ttg ccg gcg ttg tcc tcc tgg cga agc gga ctc cgc	7536
Leu Ser Asp Val Leu Pro Ala Leu Ser Ser Trp Arg Ser Gly Leu Arg	
2500 2505 2510	
aac cgt tcg ctc gtc gat tcc tgc cgg tac cga atc agt tgg cat tcc	7584
Asn Arg Ser Leu Val Asp Ser Cys Arg Tyr Arg Ile Ser Trp His Ser	
2515 2520 2525	
tct cgg gag gtg ccg gcc ccg aag att tcc ggt acc tgg ctg ttg gtc	7632
Ser Arg Glu Val Pro Ala Pro Lys Ile Ser Gly Thr Trp Leu Leu Val	
2530 2535 2540	
gtg ccc ggt gct gcg gat gac gga ttg gtc acg gct ttg acg agt tca	7680
Val Pro Gly Ala Ala Asp Asp Gly Leu Val Thr Ala Leu Thr Ser Ser	
2545 2550 2555 2560	

ctg gtc gga ggc ggc gcc gag gtc gtc cgg atc ggc ctg tcc gaa gag	7728
Leu Val Gly Gly Gly Ala Glu Val Val Arg Ile Gly Leu Ser Glu Glu	
2565 2570 2575	
gac ccg cac cgc gag gac gtc gca cag cgg ctg gcc aat gcg ctg acg	7776
Asp Pro His Arg Glu Asp Val Ala Gln Arg Leu Ala Asn Ala Leu Thr	
2580 2585 2590	
gat gcc ggt caa ctc ggt ggc gtg ctt tcg ctg ttg ggg ctc gat gaa	7824
Asp Ala Gly Gln Leu Gly Gly Val Leu Ser Leu Leu Gly Leu Asp Glu	
2595 2600 2605	
tcg cct gct ccg gga ttc tcc tgc ttg cca act ggt ttc gcg ctg act	7872
Ser Pro Ala Pro Gly Phe Ser Cys Leu Pro Thr Gly Phe Ala Leu Thr	
2610 2615 2620	
gtg cag ctt ctg cgg gcc ttg cgg aag gcc gac gtc gag gcg cct ttt	7920
Val Gln Leu Leu Arg Ala Leu Arg Lys Ala Asp Val Glu Ala Pro Phe	
2625 2630 2635 2640	
tgg gcg gtg acg cgc ggc ggc gtc gcg ttg gaa gat gta cgc gtg tct	7968
Trp Ala Val Thr Arg Gly Gly Val Ala Leu Glu Asp Val Arg Val Ser	
2645 2650 2655	
ccg gag cag gcc ctg gtc tgg ggg ctg ctg cgt gtc gcg gga ctg gag	8016
Pro Glu Gln Ala Leu Val Trp Gly Leu Leu Arg Val Ala Gly Leu Glu	
2660 2665 2670	
cac ccg gag ttc tgg ggt ggc ttg atc gac ctg cca tcg gac tgg gac	8064
His Pro Glu Phe Trp Gly Gly Leu Ile Asp Leu Pro Ser Asp Trp Asp	
2675 2680 2685	
gac cga ttg ggt gcc cgg ttg gcg ggt gtg ttg gcg gat ggt ggc gag	8112
Asp Arg Leu Gly Ala Arg Leu Ala Gly Val Leu Ala Asp Gly Gly Glu	
2690 2695 2700	
gat caa gtc gcc att cgc cgt ggt ggt gtg ttc gtg cgg cgg ttg gaa	8160
Asp Gln Val Ala Ile Arg Arg Gly Gly Val Phe Val Arg Arg Leu Glu	
2705 2710 2715 2720	
cgc gct ggt gcg tcg ggt gcc ggg tcg gtg tgg cgt cct cgg ggg acg	8208
Arg Ala Gly Ala Ser Gly Ala Gly Ser Val Trp Arg Pro Arg Gly Thr	
2725 2730 2735	
gtg ttg gtg acg ggt ggt acg ggc ggt ttg ggg gcg cat gtt gcc cgg	8256
Val Leu Val Thr Gly Gly Thr Gly Gly Leu Gly Ala His Val Ala Arg	
2740 2745 2750	
tgg ttg gcc ggt gcc ggg gct gag cac gtg gtg ttg acc agc cgt cga	8304
Trp Leu Ala Gly Ala Gly Ala Glu His Val Val Leu Thr Ser Arg Arg	
2755 2760 2765	
gga gcg gac gct ccg ggc gct ggg gaa ttg cgg gcg gag ctg gag gcg	8352
Gly Ala Asp Ala Pro Gly Ala Gly Glu Leu Arg Ala Glu Leu Glu Ala	
2770 2775 2780	

ctg	ggt	gct	cgg	gtg	tcg	att	gtg	ccc	tgc	gac	gtg	gct	gat	cgt	gac	8400
Leu	Gly	Ala	Arg	Val	Ser	Ile	Val	Pro	Cys	Asp	Val	Ala	Asp	Arg	Asp	
2785			2790			2795			2800							
gca	gtg	gct	gga	gtg	ttg	gca	ggg	atc	ggt	ggg	gag	tgt	ccg	ctg	act	8448
Ala	Val	Ala	Gly	Val	Leu	Ala	Gly	Ile	Gly	Gly	Glu	Cys	Pro	Leu	Thr	
2805			2810			2815										
gcg	gtg	gta	cac	gcc	gcc	ggg	gtc	ggc	gag	gcg	ggc	gac	gta	gtg	gag	8496
Ala	Val	Val	His	Ala	Ala	Gly	Val	Gly	Glu	Ala	Gly	Asp	Val	Val	Glu	
2820			2825			2830										
atg	ggt	ttg	gcg	gat	ttt	gca	gcg	gtg	ttg	tcg	gcg	aag	gtg	cgt	ggt	8544
Met	Gly	Leu	Ala	Asp	Phe	Ala	Ala	Val	Leu	Ser	Ala	Lys	Val	Arg	Gly	
2835			2840			2845										
gcg	gcg	aat	ctg	gac	gag	ttg	ctg	gcc	gac	tcg	gag	ctg	gat	gcg	ttt	8592
Ala	Ala	Asn	Leu	Asp	Glu	Leu	Leu	Ala	Asp	Ser	Glu	Leu	Asp	Ala	Phe	
2850			2855			2860										
gtg	atg	ttc	tcc	tcg	gtg	tcg	ggg	gtg	tgg	gga	gcc	ggc	gga	cag	ggt	8640
Val	Met	Phe	Ser	Ser	Val	Ser	Gly	Val	Trp	Gly	Ala	Gly	Gly	Gln	Gly	
2865			2870			2875			2880							
gcg	tat	gcg	gct	gcg	aac	gcc	tac	ttg	gat	gcg	ttg	gcc	gag	cag	cgt	8688
Ala	Tyr	Ala	Ala	Ala	Asn	Ala	Tyr	Leu	Asp	Ala	Leu	Ala	Glu	Gln	Arg	
2885			2890			2895										
cgg	gcg	agg	gga	ttg	gtc	ggg	acc	gcg	gtt	gcg	tgg	gga	ccg	tgg	gcc	8736
Arg	Ala	Arg	Gly	Leu	Val	Gly	Thr	Ala	Val	Ala	Trp	Gly	Pro	Trp	Ala	
2900			2905			2910										
ggt	gac	ggc	atg	gcc	gcc	ggc	gaa	acc	ggc	gca	cag	ctg	cac	cgg	atg	8784
Gly	Asp	Gly	Met	Ala	Ala	Gly	Glu	Thr	Gly	Ala	Gln	Leu	His	Arg	Met	
2915			2920			2925										
ggc	ctg	gcg	tcg	atg	gaa	ccg	agc	gcg	gcg	ctg	ctg	gca	ctt	cag	ggt	8832
Gly	Leu	Ala	Ser	Met	Glu	Pro	Ser	Ala	Ala	Leu	Leu	Ala	Leu	Gln	Gly	
2930			2935			2940										
gca	ttg	gac	cgc	gat	gag	acc	tcc	ctc	gtc	gtg	gcc	gat	gtc	gat	tgg	8880
Ala	Leu	Asp	Arg	Asp	Glu	Thr	Ser	Leu	Val	Val	Ala	Asp	Val	Asp	Trp	
2945			2950			2955			2960							
gca	cgg	ttc	gcc	cca	gcc	ttc	acc	tcg	gca	cgt	cga	cgc	ccg	ctg	ctg	8928
Ala	Arg	Phe	Ala	Pro	Ala	Phe	Thr	Ser	Ala	Arg	Arg	Arg	Pro	Leu	Leu	
2965			2970			2975										
gac	acc	atc	gac	gag	gcc	cga	gcc	gca	ttg	gaa	acc	acc	ggc	gaa	caa	8976
Asp	Thr	Ile	Asp	Glu	Ala	Arg	Ala	Ala	Leu	Glu	Thr	Thr	Gly	Glu	Gln	
2980			2985			2990										
gcg	ggc	aca	ggc	aaa	ccc	gtt	gag	ctg	acg	caa	cgc	ctg	gcc	gga	ctg	9024
Ala	Gly	Thr	Gly	Lys	Pro	Val	Glu	Leu	Thr	Gln	Arg	Leu	Ala	Gly	Leu	
2995			3000			3005										
tcg	cgg	aag	gaa	cgc	gac	gat	gcg	gta	ttg	gat	ctg	gtg	cgg	gcg	qag	9072

Ser Arg Lys Glu Arg Asp Asp Ala Val Leu Asp Leu Val Arg Ala Glu
 3010 3015 3020
 acg gcg gct gtg ctg gga cgc gac gat gcc acg gcc ctg gcg cca tcg 9120
 Thr Ala Ala Val Leu Gly Arg Asp Asp Ala Thr Ala Leu Ala Pro Ser
 3025 3030 3035 3040
 cgg ccg ttc cag gaa ctc gga ttc gac tcc ttg atg gcg gtg gag ctg 9168
 Arg Pro Phe Gln Glu Leu Gly Phe Asp Ser Leu Met Ala Val Glu Leu
 3045 3050 3055
 cgc aac cgg ctg aac acc gcc acc ggg atc cag ctg ccc gcc agc acg 9216
 Arg Asn Arg Leu Asn Thr Ala Thr Gly Ile Gln Leu Pro Ala Ser Thr
 3060 3065 3070
 att ttc gac tac ccc aat gcc gag tcg ctg tcg cgt cac ctc tgc gcc 9264
 Ile Phe Asp Tyr Pro Asn Ala Glu Ser Leu Ser Arg His Leu Cys Ala
 3075 3080 3085
 gag ctt ttc cca acg gag act acc gtg gac tcg gcc ctt gcc gag ctc 9312
 Glu Leu Phe Pro Thr Glu Thr Thr Val Asp Ser Ala Leu Ala Glu Leu
 3090 3095 3100
 gat cga atc gag cag cag ctc tcg atg ctc acc ggc gaa gcg cgg gca 9360
 Asp Arg Ile Glu Gln Gln Leu Ser Met Leu Thr Gly Glu Ala Arg Ala
 3105 3110 3115 3120
 cgg gac cga atc gcg aca cga ctg cga gcc ctc cac gag aag tgg aac 9408
 Arg Asp Arg Ile Ala Thr Arg Leu Arg Ala Leu His Glu Lys Trp Asn
 3125 3130 3135
 agc gca gct gaa gta ccg acc gga gcc gat gtc ctg agc acg ctc gat 9456
 Ser Ala Ala Glu Val Pro Thr Gly Ala Asp Val Leu Ser Thr Leu Asp
 3140 3145 3150
 tcg gcg acg cac gac gag ata ttc gag ttc atc gac aac gag ctc gac 9504
 Ser Ala Thr His Asp Glu Ile Phe Glu Phe Ile Asp Asn Glu Leu Asp
 3155 3160 3165
 ctg tcc tga 9513
 Leu Ser
 3170

<210> 46
 <211> 3170
 <212> PRT
 <213> Saccharopolyspora spinosa

<400> 46
 Met Ser Asn Glu Glu Lys Leu Arg Glu Tyr Leu Arg Arg Ala Leu Val
 1 5 10 15
 Asp Leu His Gln Ala Arg Glu Arg Leu His Glu Ala Glu Ser Gly Glu
 20 25 30
 Arg Glu Pro Ile Ala Ile Val Ala Met Gly Cys Arg Tyr Pro Gly Gly

35	40	45																	
Val	Gln	Asp	Pro	Glu	Gly	Leu	Trp	Lys	Leu	Val	Ala	Ser	Gly	Gly	Asp				
50						55					60								
Ala	Ile	Gly	Glu	Phe	Pro	Ala	Asp	Arg	Gly	Trp	His	Leu	Asp	Glu	Leu				
65					70					75					80				
Tyr	Asp	Pro	Asp	Pro	Asp	Gln	Pro	Gly	Thr	Cys	Tyr	Thr	Arg	His	Gly				
				85					90					95					
Gly	Phe	Leu	His	Asp	Ala	Gly	Glu	Phe	Asp	Ala	Gly	Phe	Phe	Asp	Ile				
			100					105					110						
Ser	Pro	Arg	Glu	Ala	Leu	Ala	Met	Asp	Pro	Gln	Gln	Arg	Leu	Leu	Leu				
		115					120					125							
Glu	Ile	Ser	Trp	Glu	Thr	Val	Glu	Ser	Ala	Gly	Met	Asp	Pro	Arg	Ser				
	130					135					140								
Leu	Arg	Gly	Ser	Arg	Thr	Gly	Val	Phe	Ala	Gly	Leu	Met	Tyr	Glu	Gly				
145					150					155					160				
Tyr	Asp	Thr	Gly	Ala	His	Arg	Ala	Gly	Glu	Gly	Val	Glu	Gly	Tyr	Leu				
			165						170					175					
Gly	Thr	Gly	Asn	Ala	Gly	Ser	Val	Ala	Ser	Gly	Arg	Val	Ala	Tyr	Ala				
			180					185					190						
Phe	Gly	Phe	Glu	Gly	Pro	Ala	Val	Thr	Val	Asp	Thr	Ala	Cys	Ser	Ser				
	195						200					205							
Ser	Leu	Val	Ala	Leu	His	Leu	Ala	Cys	Gln	Ser	Leu	Arg	Gln	Gly	Glu				
	210					215					220								
Cys	Asp	Leu	Ala	Leu	Ala	Gly	Gly	Val	Thr	Val	Met	Ser	Thr	Pro	Glu				
225					230					235					240				
Arg	Phe	Val	Glu	Phe	Ser	Arg	Gln	Arg	Gly	Leu	Ala	Pro	Asp	Gly	Arg				
			245						250					255					
Cys	Lys	Ser	Phe	Ala	Ala	Ala	Ala	Asp	Gly	Thr	Gly	Trp	Gly	Glu	Gly				
			260					265					270						
Ala	Gly	Leu	Val	Leu	Leu	Glu	Arg	Leu	Ser	Asp	Ala	Arg	Arg	Asn	Gly				
	275						280					285							
His	Arg	Val	Leu	Ala	Val	Val	Arg	Gly	Ser	Ala	Val	Asn	Gln	Asp	Gly				
	290					295					300								
Ala	Ser	Asn	Gly	Leu	Thr	Ala	Pro	Asn	Gly	Leu	Ala	Gln	Glu	Arg	Val				
305					310					315					320				
Ile	Gln	Gln	Val	Leu	Thr	Ser	Ala	Gly	Leu	Ser	Ala	Ser	Asp	Val	Asp				
			325						330					335					
Ala	Val	Glu	Ala	His	Gly	Thr	Gly	Thr	Arg	Leu	Gly	Asp	Pro	Ile	Glu				

340					345					350					
Ala	Gln	Ala	Leu	Ile	Ala	Ala	Tyr	Gly	Gln	Asp	Arg	Asp	Arg	Asp	Arg
355						360						365			
Pro	Leu	Trp	Leu	Gly	Ser	Val	Lys	Ser	Asn	Ile	Gly	His	Thr	Gln	Ala
370						375						380			
Ala	Ala	Gly	Val	Ala	Gly	Val	Ile	Lys	Met	Val	Met	Ala	Met	Arg	His
385						390						395			
Gly	Glu	Leu	Pro	Arg	Thr	Leu	His	Val	Asp	Glu	Pro	Asn	Ser	His	Val
			405						410			415			
Asp	Trp	Ser	Ala	Gly	Ala	Val	Arg	Leu	Leu	Thr	Glu	Asn	Ile	Arg	Trp
			420						425			430			
Pro	Gly	Thr	Gly	Thr	Arg	Arg	Ala	Gly	Val	Ser	Ser	Phe	Gly	Val	Ser
			435						440			445			
Gly	Thr	Asn	Ala	His	Val	Ile	Leu	Glu	His	Asp	Pro	Leu	Ala	Val	Thr
450						455						460			
Glu	Asn	Glu	Glu	Ala	Ala	Gln	Ser	Pro	Ala	Pro	Gly	Ile	Val	Pro	Trp
465						470						475			
Ala	Leu	Ser	Gly	Arg	Ser	Ser	Thr	Ala	Leu	Arg	Ala	Gln	Ala	Glu	Arg
			485						490			495			
Leu	Arg	Glu	Leu	Cys	Glu	Gln	Thr	Asp	Pro	Asp	Pro	Val	Asp	Val	Gly
			500						505			510			
Phe	Ser	Leu	Ala	Ala	Thr	Arg	Thr	Ala	Trp	Glu	His	Arg	Ala	Val	Val
515						520						525			
Leu	Gly	Arg	Asp	Ser	Ala	Thr	Leu	Arg	Ser	Gly	Leu	Gly	Val	Val	Ala
530						535						540			
Ser	Gly	Glu	Pro	Ala	Val	Asp	Val	Val	Glu	Gly	Ser	Val	Leu	Asp	Gly
545						550						555			
Glu	Val	Val	Phe	Val	Phe	Pro	Gly	Gln	Gly	Trp	Gln	Trp	Ala	Gly	Met
			565						570			575			
Ala	Val	Asp	Leu	Leu	Asp	Ala	Ser	Pro	Thr	Phe	Ala	Arg	His	Met	Asp
			580						585			590			
Glu	Cys	Ala	Thr	Ala	Leu	Arg	Arg	Tyr	Val	Asp	Trp	Ser	Leu	Val	Asp
595						600						605			
Val	Leu	Arg	Gly	Ala	Glu	Asn	Ser	Pro	Pro	Leu	Asp	Arg	Val	Asp	Val
610						615						620			
Leu	Gln	Pro	Ala	Ser	Phe	Ala	Val	Met	Val	Ser	Leu	Ala	Glu	Val	Trp
625						630						635			
Arg	Ser	Tyr	Gly	Val	Arg	Pro	Ala	Ala	Val	Val	Gly	His	Ser	Gln	Gly

645								650					655				
Glu	Ile	Ala	Ala	Ala	Cys	Ala	Ala	Gly	Val	Leu	Pro	Leu	Glu	Asp	Ala		
660								665					670				
Ala	Arg	Leu	Val	Ala	Leu	Arg	Ser	Arg	Ala	Leu	Lys	Gly	Leu	Ser	Gly		
675								680					685				
Arg	Gly	Gly	Met	Ala	Ser	Leu	Ala	Cys	Pro	Ala	Asp	Glu	Val	Ala	Ala		
690								695					700				
Leu	Phe	Ala	Gly	Ser	Gly	Gly	Arg	Leu	Glu	Val	Ala	Ala	Ile	Asn	Gly		
705								710					715				
Pro	Arg	Ser	Val	Val	Val	Ser	Gly	Asp	Leu	Glu	Ala	Val	Asp	Glu	Leu		
720								725					730				
Leu	Ala	Glu	Cys	Ala	Glu	Lys	Asp	Met	Arg	Ala	Arg	Arg	Ile	Pro	Val		
735								740					745				
Asp	Tyr	Ala	Ser	His	Ser	Ala	His	Val	Glu	Val	Val	Arg	Ser	Pro	Val		
750								755					760				
Leu	Ala	Ala	Ala	Ala	Gly	Val	Arg	His	Arg	Asp	Gly	Gln	Val	Pro	Trp		
765								770					775				
Trp	Ser	Thr	Val	Ile	Gly	Asp	Trp	Val	Asp	Pro	Ala	Arg	Leu	Asp	Gly		
780								785					790				
Glu	Tyr	Trp	Tyr	Arg	Asn	Leu	Arg	Gln	Pro	Val	Arg	Phe	Glu	His	Ala		
795								800					805				
Val	Gln	Gly	Leu	Val	Glu	Arg	Gly	Phe	Gly	Leu	Phe	Ile	Glu	Met	Ser		
810								815					820				
Ala	His	Pro	Val	Leu	Thr	Thr	Ala	Val	Glu	Glu	Thr	Gly	Ala	Glu	Ser		
825								830					835				
Glu	Thr	Ala	Val	Ala	Ala	Val	Gly	Thr	Leu	Arg	Arg	Asp	Ser	Gly	Gly		
840								845					850				
Leu	Arg	Arg	Leu	Leu	His	Ser	Leu	Ala	Glu	Ala	Tyr	Val	Arg	Gly	Ala		
855								860					865				
Thr	Val	Asp	Trp	Ala	Val	Ala	Phe	Gly	Gly	Ala	Gly	Arg	Arg	Leu	Asp		
870								875					880				
Leu	Pro	Thr	Tyr	Pro	Phe	Gln	Arg	Gln	Arg	Tyr	Trp	Leu	Asp	Lys	Gly		
885								890					895				
Ala	Ala	Ser	Asp	Glu	Ala	Arg	Ala	Val	Ser	Asp	Pro	Ala	Ala	Gly	Trp		
900								905					910				
Phe	Trp	Gln	Ala	Val	Ala	Arg	Gln	Asp	Leu	Lys	Ser	Val	Ser	Asp	Ala		
915								920					925				
Leu	Asp	Leu	Asp	Ala	Asp	Ala	Pro	Leu	Ser	Ala	Thr	Leu	Pro	Ala	Leu		
930								935					940				

945		950		955		960
Ser Val Trp His Arg Gln Glu Arg Glu Arg Val Leu Ala Asp Gly Trp						
	965			970		975
Arg Tyr Arg Val Asp Trp Val Arg Val Ala Pro Gln Pro Val Arg Arg						
	980			985		990
Thr Arg Glu Thr Trp Leu Leu Val Val Pro Pro Gly Gly Ile Glu Glu						
	995		1000		1005	
Ala Leu Val Glu Arg Leu Thr Asp Ala Leu Asn Thr Arg Gly Ile Ser						
	1010		1015		1020	
Thr Leu Arg Leu Asp Val Pro Pro Ala Ala Thr Ser Gly Glu Leu Ala						
	1025		1030		1035	1040
Thr Glu Leu Arg Ala Ala Ala Asp Gly Asp Pro Val Lys Ala Ile Leu						
	1045		1050		1055	
Ser Leu Thr Ala Leu Asp Glu Arg Pro His Pro Glu Cys Lys Asp Val						
	1060		1065		1070	
Pro Ser Gly Ile Ala Leu Leu Leu Asn Leu Val Lys Ala Leu Gly Glu						
	1075		1080		1085	
Ala Asp Leu Arg Ile Pro Leu Trp Thr Ile Thr Arg Gly Ala Val Lys						
	1090		1095		1100	
Ala Gly Pro Ala Asp Arg Leu Leu Arg Pro Met Gln Ala Gln Ala Trp						
	1105		1110		1115	1120
Gly Leu Gly Arg Val Ala Ala Leu Glu His Pro Glu Arg Trp Gly Gly						
	1125		1130		1135	
Leu Ile Asp Leu Pro Asp Ser Leu Asp Gly Asp Val Leu Thr Arg Leu						
	1140		1145		1150	
Gly Glu Ala Leu Thr Asn Gly Leu Ala Glu Asp Gln Leu Ala Ile Arg						
	1155		1160		1165	
Gln Ser Gly Val Leu Ala Arg Arg Leu Val Pro Ala Pro Ala Asn Gln						
	1170		1175		1180	
Pro Ala Gly Arg Lys Trp Arg Pro Arg Gly Ser Ala Leu Ile Thr Gly						
	1185		1190		1195	1200
Gly Leu Gly Ala Val Gly Ala Gln Val Ala Arg Trp Leu Ala Glu Ile						
	1205		1210		1215	
Gly Ala Glu Arg Ile Val Leu Thr Ser Arg Arg Gly Asn Gln Ala Ala						
	1220		1225		1230	
Gly Ala Ala Glu Leu Glu Ala Glu Leu Arg Ala Leu Gly Ala Gln Val						
	1235		1240		1245	
Ser Ile Val Ala Cys Asp Val Thr Asp Arg Ala Glu Met Ser Ala Leu						

1250	1255	1260
Leu Ala Glu Phe Asp Val Thr Ala Val Phe His Ala Ala Gly Val Gly		
1265	1270	1275 1280
Arg Leu Leu Pro Leu Ala Glu Thr Asp Gln Asn Gly Leu Ala Glu Ile		
	1285	1290 1295
Cys Ala Ala Lys Val Arg Gly Ala Gln Val Leu Asp Glu Leu Cys Asp		
	1300	1305 1310
Ser Thr Asp Leu Asp Ala Phe Val Leu Phe Ser Ser Gly Ala Gly Val		
	1315	1320 1325
Trp Gly Gly Gly Gly Gln Gly Ala Tyr Gly Ala Ala Asn Ala Phe Leu		
	1330	1335 1340
Asp Thr Leu Ala Glu Gln Arg Arg Ala Arg Gly Leu Pro Ala Thr Ser		
1345	1350	1355 1360
Ile Ser Trp Gly Ser Trp Ala Gly Gly Gly Met Ala Asp Gly Ala Ala		
	1365	1370 1375
Gly Glu His Leu Arg Arg Arg Gly Ile Arg Pro Met Pro Ala Ala Ser		
	1380	1385 1390
Ala Ile Leu Ala Leu Gln Glu Val Leu Asp Gln Asp Glu Thr Cys Val		
	1395	1400 1405
Ser Ile Ala Asp Val Asp Trp Asp Arg Phe Val Pro Thr Phe Ala Ala		
	1410	1415 1420
Thr Arg Ala Thr Arg Leu Phe Asp Glu Val Pro Ala Ala Arg Lys Ala		
1425	1430	1435 1440
Met Pro Ala Asn Gly Pro Ala Glu Pro Gly Gly Ser Pro Phe Ala Arg		
	1445	1450 1455
Asn Leu Ala Glu Leu Pro Glu Ala Gln Arg Arg His Glu Leu Val Asp		
	1460	1465 1470
Leu Val Cys Ala Gln Val Ala Thr Val Leu Gly His Gly Ser Arg Glu		
	1475	1480 1485
Glu Val Gln Pro Glu Arg Ala Phe Arg Ala Leu Gly Phe Asp Ser Leu		
	1490	1495 1500
Met Ala Val Asp Leu Arg Asn Arg Leu Thr Thr Ala Thr Gly Leu Arg		
1505	1510	1515 1520
Leu Pro Thr Thr Thr Val Phe Asp Tyr Pro Asn Pro Ala Ala Leu Ala		
	1525	1530 1535
Ala His Leu Leu Glu Glu Leu Val Gly Asp Val Ala Ser Ala Val		
	1540	1545 1550
Thr Ala Ala Ser Ala Pro Ala Ser Asp Glu Pro Ile Ala Ile Val Ala		

1555	1560	1565
Met Ser Cys Arg Phe Pro Gly Gly Ala His Ser Pro Glu Asp Leu Trp 1570 1575 1580		
Arg Leu Val Ala Ala Gly Thr Glu Val Ile Gly Glu Phe Pro Ser Asp 1585 1590 1595 1600		
Arg Gly Trp Asp Ala Glu Gly Leu Tyr Asp Pro Asp Ala Ser Arg Pro 1605 1610 1615		
Gly Thr Thr Tyr Ala Arg Met Ala Gly Phe Leu Tyr Asp Ala Gly Glu 1620 1625 1630		
Phe Asp Ala Asp Leu Phe Gly Ile Ser Pro Arg Glu Ala Leu Ala Met 1635 1640 1645		
Asp Pro Gln Gln Arg Leu Val Leu Glu Ile Ala Trp Glu Ala Leu Glu 1650 1655 1660		
Arg Ala Gly Ile Asp Pro Leu Ser Leu Lys Gly Ser Gly Val Gly Thr 1665 1670 1675 1680		
Tyr Ile Gly Ala Gly Ser Arg Gly Tyr Ala Thr Asp Val Arg Gln Phe 1685 1690 1695		
Pro Glu Glu Ala Glu Gly Tyr Leu Leu Thr Gly Thr Ser Ala Ser Val 1700 1705 1710		
Leu Ser Gly Arg Val Ala Tyr Ser Phe Gly Phe Glu Gly Pro Ala Val 1715 1720 1725		
Thr Val Asp Thr Ala Cys Ser Ser Ser Leu Val Ala Leu His Leu Ala 1730 1735 1740		
Cys Gln Ser Leu Arg Ser Gly Glu Cys Asp Leu Ala Leu Ala Gly Gly 1745 1750 1755 1760		
Val Thr Val Met Ser Thr Pro Glu Met Phe Val Glu Phe Ser Arg Gln 1765 1770 1775		
Arg Gly Leu Ala Pro Asp Gly Arg Cys Lys Ser Phe Ala Glu Ser Ala 1780 1785 1790		
Asp Gly Thr Gly Trp Gly Glu Gly Ala Gly Leu Leu Leu Leu Glu Arg 1795 1800 1805		
Leu Ser Asp Ala His Arg Asn Gly His Arg Val Leu Ala Val Val Arg 1810 1815 1820		
Gly Ser Ala Val Asn Gln Asp Gly Ala Ser Asn Gly Leu Ala Ala Pro 1825 1830 1835 1840		
Asn Gly Pro Ser Gln Gln Arg Val Ile Asn Gln Ala Leu Ala Asn Ala 1845 1850 1855		
Ala Leu Ser Ala Ser Asp Val Asp Ala Val Glu Ala His Gly Thr Gly		

1860	1865	1870
Thr Arg Leu Gly Asp Pro Ile Glu Ala Gln Ala Leu Ile Ala Thr Tyr		
1875	1880	1885
Gly Gln Ala Arg Glu Arg Asp Arg Pro Leu Trp Leu Gly Ser Val Lys		
1890	1895	1900
Ser Asn Ile Gly His Thr Gln Ala Ala Ala Gly Val Ala Gly Val Ile		
1905	1910	1915
Lys Met Val Met Ala Met Arg His Gly Gln Leu Pro Ala Ser Leu His		
1925	1930	1935
Ala Asp Glu Pro Thr Ser Glu Val Asp Trp Ser Ser Gly Ala Val Arg		
1940	1945	1950
Leu Leu Ala Glu Gln Val Pro Trp Pro Glu Ser Asp Arg Val Arg Arg		
1955	1960	1965
Val Gly Val Ser Ser Phe Gly Ile Ser Gly Thr Asn Ala His Val Ile		
1970	1975	1980
Leu Glu Gln Ala Thr Asn Ala Pro Asp Ser Thr Ala Glu Thr Asp Lys		
1985	1990	1995
Thr Glu Ser Gly Ser Thr Val Asp Ile Pro Val Val Pro Trp Leu Val		
2005	2010	2015
Ser Gly Lys Thr Thr Asp Ser Leu Arg Gly Gln Ala Glu Arg Val Leu		
2020	2025	2030
Ser Gln Val Glu Ser Arg Pro Glu Gln Arg Ser Leu Asp Val Ala Tyr		
2035	2040	2045
Ser Leu Ala Ser Gly Arg Ala Ala Leu Asp Glu Arg Ala Val Val Leu		
2050	2055	2060
Gly Ala Asp Arg Gly Glu Leu Val Ala Gly Leu Ala Ala Leu Ala Ala		
2065	2070	2075
Gly Gln Glu Ala Ser Gly Val Ile Ser Gly Thr Arg Ala Ser Ala Arg		
2085	2090	2095
Phe Gly Phe Val Phe Ser Gly Gln Gly Gly Gln Trp Leu Gly Met Gly		
2100	2105	2110
Arg Ala Leu Tyr Ser Lys Phe Pro Val Phe Ala Ala Ala Phe Asp Glu		
2115	2120	2125
Ala Cys Ala Glu Leu Glu Ala His Leu Gly Glu Asp Arg Arg Val Arg		
2130	2135	2140
Asp Val Val Phe Gly Ser Asp Ala Gln Leu Leu Asp Gln Thr Leu Trp		
2145	2150	2155
Ala Gln Ser Gly Leu Phe Ala Leu Gln Ala Gly Leu Leu Gly Leu Leu		

2165	2170	2175
Gly Ser Trp Gly Val Arg Pro Asp Val Val Met Gly His Ser Val Gly		
2180	2185	2190
Glu Leu Ala Ala Ala Phe Ala Ala Gly Val Leu Ser Leu Arg Asp Ala		
2195	2200	2205
Ala Arg Leu Val Ala Ala Arg Ala Arg Leu Met Gln Ala Leu Pro Ser		
2210	2215	2220
Asp Gly Ala Met Leu Ala Val Ala Ala Gly Glu Asp Leu Val Arg Pro		
2225	2230	2235
Leu Leu Ala Gly Arg Glu Glu Ser Val Ser Val Ala Ala Leu Asn Ala		
2245	2250	2255
Pro Gly Ser Val Val Leu Ser Gly Asp Arg Glu Val Leu Ala Ser Ile		
2260	2265	2270
Val Gly Arg Leu Thr Glu Leu Arg Val Arg Thr Arg Arg Leu Arg Val		
2275	2280	2285
Ser His Ala Phe His Ser His Arg Met Asp Pro Met Leu Gly Glu Phe		
2290	2295	2300
Ala Gln Ile Ala Glu Ser Ala Glu Phe Gly Lys Pro Thr Thr Pro Leu		
2305	2310	2315
Val Ser Thr Leu Thr Gly Glu Leu Asp Arg Ala Ala Glu Met Ser Thr		
2325	2330	2335
Pro Gly Tyr Trp Val Arg Gln Ala Arg Glu Pro Val Arg Phe Ala Asp		
2340	2345	2350
Gly Val Gln Ala Leu Ala Ala Gln Gly Ile Gly Thr Val Val Glu Leu		
2355	2360	2365
Gly Pro Asp Gly Thr Leu Ala Ala Leu Val Arg Glu Cys Ala Thr Glu		
2370	2375	2380
Ser Asp Arg Val Gly Arg Ile Ser Ser Ile Pro Leu Met Arg Arg Glu		
2385	2390	2395
Arg Asp Glu Thr Arg Ser Val Met Thr Ala Leu Ala His Leu His Thr		
2405	2410	2415
Arg Gly Gly Glu Val Asp Trp Gln Ala Phe Phe Ala Gly Thr Gly Ala		
2420	2425	2430
Arg Gln Leu Glu Leu Pro Thr Tyr Ala Phe Gln Arg Gln His Tyr Trp		
2435	2440	2445
Ile Glu Ser Ser Ala Arg Pro Ala Arg Asp Arg Ala Asp Ile Gly Glu		
2450	2455	2460
Val Ala Glu Gln Phe Trp Thr Ala Val Asp Gln Gly Asp Leu Ala Thr		

2465	2470	2475	2480
Leu Val Ala Ala Leu Asp Leu Gly Ala Asp Asp Thr Cys Ala Ser	2485	2490	2495
Leu Ser Asp Val Leu Pro Ala Leu Ser Ser Trp Arg Ser Gly Leu Arg	2500	2505	2510
Asn Arg Ser Leu Val Asp Ser Cys Arg Tyr Arg Ile Ser Trp His Ser	2515	2520	2525
Ser Arg Glu Val Pro Ala Pro Lys Ile Ser Gly Thr Trp Leu Leu Val	2530	2535	2540
Val Pro Gly Ala Ala Asp Asp Gly Leu Val Thr Ala Leu Thr Ser Ser	2545	2550	2555
Leu Val Gly Gly Gly Ala Glu Val Val Arg Ile Gly Leu Ser Glu Glu	2565	2570	2575
Asp Pro His Arg Glu Asp Val Ala Gln Arg Leu Ala Asn Ala Leu Thr	2580	2585	2590
Asp Ala Gly Gln Leu Gly Gly Val Leu Ser Leu Leu Gly Leu Asp Glu	2595	2600	2605
Ser Pro Ala Pro Gly Phe Ser Cys Leu Pro Thr Gly Phe Ala Leu Thr	2610	2615	2620
Val Gln Leu Leu Arg Ala Leu Arg Lys Ala Asp Val Glu Ala Pro Phe	2625	2630	2635
Trp Ala Val Thr Arg Gly Gly Val Ala Leu Glu Asp Val Arg Val Ser	2645	2650	2655
Pro Glu Gln Ala Leu Val Trp Gly Leu Leu Arg Val Ala Gly Leu Glu	2660	2665	2670
His Pro Glu Phe Trp Gly Gly Leu Ile Asp Leu Pro Ser Asp Trp Asp	2675	2680	2685
Asp Arg Leu Gly Ala Arg Leu Ala Gly Val Leu Ala Asp Gly Gly Glu	2690	2695	2700
Asp Gln Val Ala Ile Arg Arg Gly Gly Val Phe Val Arg Arg Leu Glu	2705	2710	2715
Arg Ala Gly Ala Ser Gly Ala Gly Ser Val Trp Arg Pro Arg Gly Thr	2725	2730	2735
Val Leu Val Thr Gly Gly Thr Gly Gly Leu Gly Ala His Val Ala Arg	2740	2745	2750
Trp Leu Ala Gly Ala Gly Ala Glu His Val Val Leu Thr Ser Arg Arg	2755	2760	2765
Gly Ala Asp Ala Pro Gly Ala Gly Glu Leu Arg Ala Glu Leu Glu Ala			

2770	2775	2780
Leu Gly Ala Arg Val Ser Ile Val Pro Cys Asp Val Ala Asp Arg Asp		
2785	2790	2795 2800
Ala Val Ala Gly Val Leu Ala Gly Ile Gly Gly Glu Cys Pro Leu Thr		
2805	2810	2815
Ala Val Val His Ala Ala Gly Val Gly Glu Ala Gly Asp Val Val Glu		
2820	2825	2830
Met Gly Leu Ala Asp Phe Ala Ala Val Leu Ser Ala Lys Val Arg Gly		
2835	2840	2845
Ala Ala Asn Leu Asp Glu Leu Leu Ala Asp Ser Glu Leu Asp Ala Phe		
2850	2855	2860
Val Met Phe Ser Ser Val Ser Gly Val Trp Gly Ala Gly Gly Gln Gly		
2865	2870	2875 2880
Ala Tyr Ala Ala Ala Asn Ala Tyr Leu Asp Ala Leu Ala Glu Gln Arg		
2885	2890	2895
Arg Ala Arg Gly Leu Val Gly Thr Ala Val Ala Trp Gly Pro Trp Ala		
2900	2905	2910
Gly Asp Gly Met Ala Ala Gly Glu Thr Gly Ala Gln Leu His Arg Met		
2915	2920	2925
Gly Leu Ala Ser Met Glu Pro Ser Ala Ala Leu Leu Ala Leu Gln Gly		
2930	2935	2940
Ala Leu Asp Arg Asp Glu Thr Ser Leu Val Val Ala Asp Val Asp Trp		
2945	2950	2955 2960
Ala Arg Phe Ala Pro Ala Phe Thr Ser Ala Arg Arg Arg Pro Leu Leu		
2965	2970	2975
Asp Thr Ile Asp Glu Ala Arg Ala Ala Leu Glu Thr Thr Gly Glu Gln		
2980	2985	2990
Ala Gly Thr Gly Lys Pro Val Glu Leu Thr Gln Arg Leu Ala Gly Leu		
2995	3000	3005
Ser Arg Lys Glu Arg Asp Asp Ala Val Leu Asp Leu Val Arg Ala Glu		
3010	3015	3020
Thr Ala Ala Val Leu Gly Arg Asp Asp Ala Thr Ala Leu Ala Pro Ser		
3025	3030	3035 3040
Arg Pro Phe Gln Glu Leu Gly Phe Asp Ser Leu Met Ala Val Glu Leu		
3045	3050	3055
Arg Asn Arg Leu Asn Thr Ala Thr Gly Ile Gln Leu Pro Ala Ser Thr		
3060	3065	3070
Ile Phe Asp Tyr Pro Asn Ala Glu Ser Leu Ser Arg His Leu Cys Ala		

3075 3080 3085
 Glu Leu Phe Pro Thr Glu Thr Thr Val Asp Ser Ala Leu Ala Glu Leu
 3090 3095 3100
 Asp Arg Ile Glu Gln Gln Leu Ser Met Leu Thr Gly Glu Ala Arg Ala
 3105 3110 3115 3120
 Arg Asp Arg Ile Ala Thr Arg Leu Arg Ala Leu His Glu Lys Trp Asn
 3125 3130 3135
 Ser Ala Ala Glu Val Pro Thr Gly Ala Asp Val Leu Ser Thr Leu Asp
 3140 3145 3150
 Ser Ala Thr His Asp Glu Ile Phe Glu Phe Ile Asp Asn Glu Leu Asp
 3155 3160 3165
 Leu Ser
 3170

<210> 47
 <211> 14775
 <212> DNA
 <213> Saccharopolyspora spinosa

<220>
 <221> CDS
 <222> (1)..(14772)
 <223> ORF21; polyketide synthase

<400> 47
 atg gcc aat gaa gaa aag ctc ttc ggc tat ctg aag aag gta act gcg 48
 Met Ala Asn Glu Glu Lys Leu Phe Gly Tyr Leu Lys Lys Val Thr Ala
 1 5 10 15
 gac ctg cat cag acc cgg cag cgc ctg ctc gcg gcc gag agc cgg agt 96
 Asp Leu His Gln Thr Arg Gln Arg Leu Leu Ala Ala Glu Ser Arg Ser
 20 25 30
 cag gag ccg atc gcg atc gtc tcg gcg agc tgc cga ctg ccc ggc ggc 144
 Gln Glu Pro Ile Ala Ile Val Ser Ala Ser Cys Arg Leu Pro Gly Gly
 35 40 45
 gtc gac tct ccc gaa gcg ctc tgg caa ctc gtg cgc act ggc acc gac 192
 Val Asp Ser Pro Glu Ala Leu Trp Gln Leu Val Arg Thr Gly Thr Asp
 50 55 60
 gcc atc tcg gag ttc ccc gcc gac cgg ggc tgg gat ctc ggc cgg ttg 240
 Ala Ile Ser Glu Phe Pro Ala Asp Arg Gly Trp Asp Leu Gly Arg Leu
 65 70 75 80
 tac gat ccc gac ccg aac cac cag gga acg tcg tac acg cgg gcc ggc 288
 Tyr Asp Pro Asp Pro Asn His Gln Gly Thr Ser Tyr Thr Arg Ala Gly
 85 90 95

ggt ttc ctc gca gga gcg ggc gat ttc gac ccc gcc atg ttc ggg att	336
Gly Phe Leu Ala Gly Ala Gly Asp Phe Asp Pro Ala Met Phe Gly Ile	
100 105 110	
tcg ccg cgt gag gcg ttg gcg atg gac ccg cag caa cgg ttg ttg ctg	384
Ser Pro Arg Glu Ala Leu Ala Met Asp Pro Gln Gln Arg Leu Leu Leu	
115 120 125	
gag ctg tcc tgg gag gcc ctc gaa cgg gcg ggc ata gac ccg aca tcc	432
Glu Leu Ser Trp Glu Ala Leu Glu Arg Ala Gly Ile Asp Pro Thr Ser	
130 135 140	
ctg cgc ggc agc aag acc ggt gtc ttc ggt ggt gtc acg ccc cag gag	480
Leu Arg Gly Ser Lys Thr Gly Val Phe Gly Gly Val Thr Pro Gln Glu	
145 150 155 160	
tac ggg ccg tcc ttg cag gag atg agc cga aac gct ggg ggt ttt gga	528
Tyr Gly Pro Ser Leu Gln Glu Met Ser Arg Asn Ala Gly Gly Phe Gly	
165 170 175	
ctc acc ggg ccg atg gtg agt gtg gcg tcg ggt ccg gtt gcg tat tcg	576
Leu Thr Gly Arg Met Val Ser Val Ala Ser Gly Arg Val Ala Tyr Ser	
180 185 190	
ttt ggt ttt gag ggt cct gcg gtg acg gtg gat acg gcg tgt tcg tcg	624
Phe Gly Phe Glu Gly Pro Ala Val Thr Val Asp Thr Ala Cys Ser Ser	
195 200 205	
tcg ttg gtg gcc ctg cat ttg gcg tgt cag tcg ttg cgt tcc ggc gaa	672
Ser Leu Val Ala Leu His Leu Ala Cys Gln Ser Leu Arg Ser Gly Glu	
210 215 220	
tgc gat ctc gcg ctg gcc ggc ggt gtg acg gtg atg gcg aca ccg gcg	720
Cys Asp Leu Ala Leu Ala Gly Gly Val Thr Val Met Ala Thr Pro Ala	
225 230 235 240	
acg ttc gtg gag ttc tcc cgt cag cgt ggt ttg gct ccg gac ggg ccg	768
Thr Phe Val Glu Phe Ser Arg Gln Arg Gly Leu Ala Pro Asp Gly Arg	
245 250 255	
tgc aag tcg ttc gcg gct gcc gcg gat ggc acc ggg tgg ggt gag ggt	816
Cys Lys Ser Phe Ala Ala Ala Ala Asp Gly Thr Gly Trp Gly Glu Gly	
260 265 270	
gcc ggt ctg gtg ttg ctg gag ccg ttg tcg gat gcg ccg ccg aat ggg	864
Ala Gly Leu Val Leu Leu Glu Arg Leu Ser Asp Ala Arg Arg Asn Gly	
275 280 285	
cac gag gtt ctg gcg gtg gtg ccg ggt agc gcg gtg aac cag gac ggc	912
His Glu Val Leu Ala Val Val Arg Gly Ser Ala Val Asn Gln Asp Gly	
290 295 300	
gcg tcg aat ggt ttg act gcg ccg aat ggt ccg tcg cag cag ccg gtg	960
Ala Ser Asn Gly Leu Thr Ala Pro Asn Gly Pro Ser Gln Gln Arg Val	
305 310 315 320	
atc acc cag gcg ttg gcg agt gcg ggg ctg tcg gtt tcc gat gtg gat	1008

Ile Thr Gln Ala Leu Ala Ser Ala Gly Leu Ser Val Ser Asp Val Asp	
325 330 335	
gcg gtc gag gca cat ggg acc ggg acc acg ttg ggt gat ccg atc gag	1056
Ala Val Glu Ala His Gly Thr Gly Thr Leu Gly Asp Pro Ile Glu	
340 345 350	
gca cag gcc ctg atc gcc acg tac ggg cag ggc cgg gag aag gat cgg	1104
Ala Gln Ala Leu Ile Ala Thr Tyr Gly Gln Gly Arg Glu Lys Asp Arg	
355 360 365	
ccg ttg tgg ttg ggg tcg gtc aag tcc aac atc ggt cac acg cag gcg	1152
Pro Leu Trp Leu Gly Ser Val Lys Ser Asn Ile Gly His Thr Gln Ala	
370 375 380	
gcc gct ggc gtt gcc ggc gtc atc aag atg gtc ttg gcg atg cgg cac	1200
Ala Ala Gly Val Ala Gly Val Ile Lys Met Val Leu Ala Met Arg His	
385 390 395 400	
ggg cag ctg ccc gcc acg ttg cat gtg gat gag ccc acg tcg gcg gtg	1248
Gly Gln Leu Pro Ala Thr Leu His Val Asp Glu Pro Thr Ser Ala Val	
405 410 415	
gac tgg tcg gcg ggt tcg gtc cgg ctt ctc acg gag aac acg ccc tgg	1296
Asp Trp Ser Ala Gly Ser Val Arg Leu Leu Thr Glu Asn Thr Pro Trp	
420 425 430	
ccg gac agt ggt cgt cct tgc cgg gtg ggg gtg tcg tcg ttc ggg atc	1344
Pro Asp Ser Gly Arg Pro Cys Arg Val Gly Val Ser Ser Phe Gly Ile	
435 440 445	
agc ggc acc aac gca cat gtg att ctc gaa cag tct cca gtc gag cag	1392
Ser Gly Thr Asn Ala His Val Ile Leu Glu Gln Ser Pro Val Glu Gln	
450 455 460	
ggc gaa ccg gcc ggg ccg gtc gaa ggc gag cgg gaa ccg gat gta gcc	1440
Gly Glu Pro Ala Gly Pro Val Glu Gly Glu Arg Glu Pro Asp Val Ala	
465 470 475 480	
gtc ccc gtg gtg cct tgg gtg ctg tcg ggt aag aca ccg gag gct gcg	1488
Val Pro Val Val Pro Trp Val Leu Ser Gly Lys Thr Pro Glu Ala Ala	
485 490 495	
cgg gcg cag gcc gaa cgg gtg cat tcg cat atc gag gac cgg ccg ggg	1536
Arg Ala Gln Ala Glu Arg Val His Ser His Ile Glu Asp Arg Pro Gly	
500 505 510	
ctg tcg ccg gtg gat gtg gcg tat tcg cta gga atg aca cgc gcg gcg	1584
Leu Ser Pro Val Asp Val Ala Tyr Ser Leu Gly Met Thr Arg Ala Ala	
515 520 525	
ctg gat gaa cgc gca gtg gtg ttg ggc tcg gac cgt gcc gcg ctc ctg	1632
Leu Asp Glu Arg Ala Val Val Leu Gly Ser Asp Arg Ala Ala Leu Leu	
530 535 540	
acc ggg ttg agg gca ttc gcc gac ggc tgc gat gcg ccc gaa gtg gtt	1680
Thr Gly Leu Arg Ala Phe Ala Asp Gly Cys Asp Ala Pro Glu Val Val	

545		550		555		560	
tcg ggg tct gtg ggg ctt ggt ggc cgc gtc ggg ttc gtg ttc tcg ggt	1728						
Ser Gly Ser Val Gly Leu Gly Gly Arg Val Gly Phe Val Phe Ser Gly							
		565		570		575	
cag ggt ggt cag tgg ccg ggg atg ggc cgg ggg ctc tac tcg gtg ttt	1776						
Gln Gly Gly Gln Trp Pro Gly Met Gly Arg Gly Leu Tyr Ser Val Phe							
		580		585		590	
ccg gtg ttc gcc gac gcg ttc gac gag gct tgc gcg gag ttg gat gca	1824						
Pro Val Phe Ala Asp Ala Phe Asp Glu Ala Cys Ala Glu Leu Asp Ala							
		595		600		605	
cac ctg ggc cag gaa ctg cgg gtt cgg gat gtg gtg ttc ggt tcg caa	1872						
His Leu Gly Gln Glu Leu Arg Val Arg Asp Val Val Phe Gly Ser Gln							
		610		615		620	
gcg tgg ttg ctg gat cgg acg gtg tgg gcg cag tcg ggt ttg ttc gcg	1920						
Ala Trp Leu Leu Asp Arg Thr Val Trp Ala Gln Ser Gly Leu Phe Ala							
		625		630		635	640
ttg cag att ggc ttg ctg cgg ctg ctg ggt tcg tgg ggt gtt cgg ccg	1968						
Leu Gln Ile Gly Leu Leu Arg Leu Leu Gly Ser Trp Gly Val Arg Pro							
		645		650		655	
gat gtg gtg ttg ggg cac tcg gtg ggt gag ctg gct gcg gtg cat gcg	2016						
Asp Val Val Leu Gly His Ser Val Gly Glu Leu Ala Ala Val His Ala							
		660		665		670	
gct ggt gtg ttg tcg ttg tcg gag gcc gcg cgg ttg gtg gcg ggt cgc	2064						
Ala Gly Val Leu Ser Leu Ser Glu Ala Ala Arg Leu Val Ala Gly Arg							
		675		680		685	
gcc cgg ttg atg cag gcg ttg cct tct ggt ggt gcc atg ctc gcg gtc	2112						
Ala Arg Leu Met Gln Ala Leu Pro Ser Gly Gly Ala Met Leu Ala Val							
		690		695		700	
gct acg ggt gag ttt cag gtc gat cct ctg ctg gat ggg gtg cgg gac	2160						
Ala Thr Gly Glu Phe Gln Val Asp Pro Leu Leu Asp Gly Val Arg Asp							
		705		710		715	720
cgg atc ggt atc gcg gcg gtg aat ggc ccg gaa tcg gtt gtg ctc tct	2208						
Arg Ile Gly Ile Ala Ala Val Asn Gly Pro Glu Ser Val Val Leu Ser							
		725		730		735	
ggt gac cgc gag ctg ctc acc gag atc gct gat cgg ttg cac gat cag	2256						
Gly Asp Arg Glu Leu Leu Thr Glu Ile Ala Asp Arg Leu His Asp Gln							
		740		745		750	
ggg tgc cgg acc cgg tgg ttg cgg gtg tcg cat gct ttc cat tcg ccc	2304						
Gly Cys Arg Thr Arg Trp Leu Arg Val Ser His Ala Phe His Ser Pro							
		755		760		765	
cat atg gag ccg atg ctg gag gag ttc gcc cag atc tcc cga ggc cgc	2352						
His Met Glu Pro Met Leu Glu Glu Phe Ala Gln Ile Ser Arg Gly Arg							
		770		775		780	

gaa tat cac gca ccg gaa ctg ccg atc atc tcg acc ctg atc ggt gag	2400
Glu Tyr His Ala Pro Glu Leu Pro Ile Ile Ser Thr Leu Ile Gly Glu	
785 790 795 800	
ctg gac ggt ggt cga gtg atg ggc act ccc gag tac tgg gtg cgt cag	2448
Leu Asp Gly Gly Arg Val Met Gly Thr Pro Glu Tyr Trp Val Arg Gln	
805 810 815	
gtg cgt gag ccc gtc cgt ttc gcc gag ggt gtc cag gcg ctt gtc ggt	2496
Val Arg Glu Pro Val Arg Phe Ala Glu Gly Val Gln Ala Leu Val Gly	
820 825 830	
cag ggt gtc ggc acg att gtc gaa ttg ggt ccg gac ggg gcg ttg tcg	2544
Gln Gly Val Gly Thr Ile Val Glu Leu Gly Pro Asp Gly Ala Leu Ser	
835 840 845	
acg ttg gtc gag gag tgt gtg gcg gaa tcc ggg cgg gtg gcc ggg atc	2592
Thr Leu Val Glu Glu Cys Val Ala Glu Ser Gly Arg Val Ala Gly Ile	
850 855 860	
ccg ctg atg cgc aag gac cgc gac gag gcg cga acc gtg ctg gca gct	2640
Pro Leu Met Arg Lys Asp Arg Asp Glu Ala Arg Thr Val Leu Ala Ala	
865 870 875 880	
ttg gcg cag atc cac acc cgt ggt ggt gag gtg gac tgg cgg tcg ttt	2688
Leu Ala Gln Ile His Thr Arg Gly Gly Glu Val Asp Trp Arg Ser Phe	
885 890 895	
ttc gcc ggt acc ggg gcg aag caa gtc gac ctg ccc acc tac gcc ttc	2736
Phe Ala Gly Thr Gly Ala Lys Gln Val Asp Leu Pro Thr Tyr Ala Phe	
900 905 910	
cag cgg cag cgg tac tgg ctg gca tcc acc ggg cgt gcg ggt gac gtg	2784
Gln Arg Gln Arg Tyr Trp Leu Ala Ser Thr Gly Arg Ala Gly Asp Val	
915 920 925	
acc gcc gcc gga ttg gcc gag gcg gac cat ccg ctg ctc ggt gcg gtg	2832
Thr Ala Ala Gly Leu Ala Glu Ala Asp His Pro Leu Leu Gly Ala Val	
930 935 940	
gtt gcg ttg gca gac ggc gaa ggt gtg gtg ctg acc ggt cgg ttg aca	2880
Val Ala Leu Ala Asp Gly Glu Gly Val Val Leu Thr Gly Arg Leu Thr	
945 950 955 960	
gcg ggt tcg cat ccg tgg ttg tcc gat cac cgg gtg ctg ggc gaa atc	2928
Ala Gly Ser His Pro Trp Leu Ser Asp His Arg Val Leu Gly Glu Ile	
965 970 975	
gtc gtc ccc ggc acc gcg atc gtc gag ctg gtg tgg cac gtc ggc gag	2976
Val Val Pro Gly Thr Ala Ile Val Glu Leu Val Trp His Val Gly Glu	
980 985 990	
cgc ctc ggt tgt ggc cgg gtg gaa gaa ctg gct ttg gaa gcg ccc ctg	3024
Arg Leu Gly Cys Gly Arg Val Glu Glu Leu Ala Leu Glu Ala Pro Leu	
995 1000 1005	

atc ctg ccg gat cat gga gcg gtc cag gtt cag gtg ctg gtg gga ccg Ile Leu Pro Asp His Gly Ala Val Gln Val Gln Val Leu Val Gly Pro 1010 1015 1020	3072
ccc ggg gaa tcc gga gcc cgg tcg gtg gcg ctc tac tcc tgt cct ggc Pro Gly Glu Ser Gly Ala Arg Ser Val Ala Leu Tyr Ser Cys Pro Gly 1025 1030 1035 1040	3120
gag gcg atc gaa ccc gag tgg aag aag cac gcg acg ggc gtg ctt ctc Glu Ala Ile Glu Pro Glu Trp Lys Lys His Ala Thr Gly Val Leu Leu 1045 1050 1055	3168
cca ccc gtg gcc gcc gag aac cat gag ctg acc gca tgg ccc ccg gag Pro Pro Val Ala Ala Glu Asn His Glu Leu Thr Ala Trp Pro Pro Glu 1060 1065 1070	3216
aat gcg acc gaa atc gat gca gac ggg gtc tac gca ttc ctt gaa ggg Asn Ala Thr Glu Ile Asp Ala Asp Gly Val Tyr Ala Phe Leu Glu Gly 1075 1080 1085	3264
cac ggt ttc gcg tac gga ccg gcc ttt aga tgt ctg cgc ggt gcc tgg His Gly Phe Ala Tyr Gly Pro Ala Phe Arg Cys Leu Arg Gly Ala Trp 1090 1095 1100	3312
cga cga ggc ggg gag gtg ttc gcc gaa gtc gca ttg ccg gat gac atg Arg Arg Gly Gly Glu Val Phe Ala Glu Val Ala Leu Pro Asp Asp Met 1105 1110 1115 1120	3360
cag gcg ggg gtc gat cga ttc ggc gtc cac ccc gcg ttg ctg gac gcg Gln Ala Gly Val Asp Arg Phe Gly Val His Pro Ala Leu Leu Asp Ala 1125 1130 1135	3408
gtt ctg cat gcc gcc gca gcc gag acg tcg gtg gtc cag agc gaa gcg Val Leu His Ala Ala Ala Ala Glu Thr Ser Val Val Gln Ser Glu Ala 1140 1145 1150	3456
cgg gtg ccg ttc tcg tgg cgt ggg gtg gaa ctt cgc gcc act gaa agc Arg Val Pro Phe Ser Trp Arg Gly Val Glu Leu Arg Ala Thr Glu Ser 1155 1160 1165	3504
gcg gtg gtg cgg gcg cgc ctc tcg ttg act tcg gat gac gaa ctg tcg Ala Val Val Arg Ala Arg Leu Ser Leu Thr Ser Asp Asp Glu Leu Ser 1170 1175 1180	3552
ttg gtc gca gtg gac ccg gct ggc cga ttc gtg gcc acg gtt gat tcg Leu Val Ala Val Asp Pro Ala Gly Arg Phe Val Ala Thr Val Asp Ser 1185 1190 1195 1200	3600
ctg gtg acc cga ccg atc tcc cgg cag cag gtg agg tct ggc gcg atc Leu Val Thr Arg Pro Ile Ser Arg Gln Gln Val Arg Ser Gly Ala Ile 1205 1210 1215	3648
ggt gat tgc ctg ttc gag gtg gag tgg cac cgg aag gcg ttg ttg gga Gly Asp Cys Leu Phe Glu Val Glu Trp His Arg Lys Ala Leu Leu Gly 1220 1225 1230	3696
aca acc gcc ggc gac gac ctt gcc atc gtc ggt gac ggt ccc agt tgg	3744

Thr Thr Ala Gly Asp Asp Leu Ala Ile Val Gly Asp Gly Pro Ser Trp	
1235 1240 1245	
ccg gaa tcg gtg cgc gca acc gca cgg ttc gcg acc ctg gat gag ttc	3792
Pro Glu Ser Val Arg Ala Thr Ala Arg Phe Ala Thr Leu Asp Glu Phe	
1250 1255 1260	
cgt gcg gcc gtg gac tcg gac gtt cct gcc ccg ggt tcg gtg ttg gtc	3840
Arg Ala Ala Val Asp Ser Asp Val Pro Ala Pro Gly Ser Val Leu Val	
1265 1270 1275 1280	
gca gct atg tcg gcc gaa gag gtc gag ggt gga tcc ctg ccg tcg cgc	3888
Ala Ala Met Ser Ala Glu Glu Val Glu Gly Gly Ser Leu Pro Ser Arg	
1285 1290 1295	
gcc caa gag tcg acc tcc gat ctg ctg gct ctc gtg cag tcg tgg ctt	3936
Ala Gln Glu Ser Thr Ser Asp Leu Leu Ala Leu Val Gln Ser Trp Leu	
1300 1305 1310	
gcg gac gag cgg ttc gcc gaa tcc cag ctc gtg gtc gtc acg cgt gca	3984
Ala Asp Glu Arg Phe Ala Glu Ser Gln Leu Val Val Val Thr Arg Ala	
1315 1320 1325	
gcg gtg tcg gcc gac tcg gat tcg gac gtc gcg gac ctg gtg ggt gcg	4032
Ala Val Ser Ala Asp Ser Asp Ser Asp Val Ala Asp Leu Val Gly Ala	
1330 1335 1340	
tcg tcg tgg ggg ttg ttg agt tca gcc cag tcg gag aac ccg ggt cgc	4080
Ser Ser Trp Gly Leu Leu Ser Ser Ala Gln Ser Glu Asn Pro Gly Arg	
1345 1350 1355 1360	
ttc gtg ctg gtg gac gtg gac ggc aca cct gag tcg tgg cag gcg ttg	4128
Phe Val Leu Val Asp Val Asp Gly Thr Pro Glu Ser Trp Gln Ala Leu	
1365 1370 1375	
ccg gcc gcc gtg cga gca gga gaa ccg cag ctg gca ctt ccg cgc ggc	4176
Pro Ala Ala Val Arg Ala Gly Glu Pro Gln Leu Ala Leu Arg Arg Gly	
1380 1385 1390	
gtg gcg ctg gtg cct ccg ttg gcg cga ctc acg gtg cgc gag gag ggc	4224
Val Ala Leu Val Pro Arg Leu Ala Arg Leu Thr Val Arg Glu Glu Gly	
1395 1400 1405	
tcc tcc ccg caa ctc gac acg gac ggg acc gtc ctc atc acg ggt ggc	4272
Ser Ser Pro Gln Leu Asp Thr Asp Gly Thr Val Leu Ile Thr Gly Gly	
1410 1415 1420	
acc ggt gcg ttg ggg gga gtg gtt gcc cgt cac ctg gtg gag gag cac	4320
Thr Gly Ala Leu Gly Gly Val Val Ala Arg His Leu Val Glu Glu His	
1425 1430 1435 1440	
ggg att ccg cgt ttg gtg ttg gca ggc ccg cgt ggc tgg aat gcg cct	4368
Gly Ile Arg Arg Leu Val Leu Ala Gly Arg Arg Gly Trp Asn Ala Pro	
1445 1450 1455	
gga gtc cac gag ttg gtg gat gag ctg gcg cgc gcg ggc gcc gtg gtt	4416
Gly Val His Glu Leu Val Asp Glu Leu Ala Arg Ala Gly Ala Val Val	

1460	1465	1470	
gag gtg gtg gct tgc gat gtg gct gac cgc acc gat ctg gag cac gtg Glu Val Val Ala Cys Asp Val Ala Asp Arg Thr Asp Leu Glu His Val 1475 1480 1485			4464
ctg gcc gcc att ccg gtc gac tgg ccg ctg cgg ggg atc gtg cat acc Leu Ala Ala Ile Pro Val Asp Trp Pro Leu Arg Gly Ile Val His Thr 1490 1495 1500			4512
gct ggg gtg ctg gcc gac gga gtg atc ggg tcc ttg tgc gcg gcg gat Ala Gly Val Leu Ala Asp Gly Val Ile Gly Ser Leu Ser Ala Ala Asp 1505 1510 1515 1520			4560
gtg ggc acg gtg ttt gcc ccg aag gtg acg ggg gca tgg cat ctg cac Val Gly Thr Val Phe Ala Pro Lys Val Thr Gly Ala Trp His Leu His 1525 1530 1535			4608
gag ttg acc cgc gat ctg gat ctg tgc ttc ttc gtt ctt ttc tct tcc Glu Leu Thr Arg Asp Leu Asp Leu Ser Phe Phe Val Leu Phe Ser Ser 1540 1545 1550			4656
ttc tcc ggg att gcg ggt gcc gca ggg cag gcc aac tac gcg gcg gcg Phe Ser Gly Ile Ala Gly Ala Ala Gly Gln Ala Asn Tyr Ala Ala Ala 1555 1560 1565			4704
aac acg ttc ctg gat gca ttg gcg cgt tat cgc cgg gcg cgt ggg ctg Asn Thr Phe Leu Asp Ala Leu Ala Arg Tyr Arg Arg Ala Arg Gly Leu 1570 1575 1580			4752
cct ggg ttg tgc ttg gcg tgg gga ctg tgg gcg caa ccc agc ggt atg Pro Gly Leu Ser Leu Ala Trp Gly Leu Trp Ala Gln Pro Ser Gly Met 1585 1590 1595 1600			4800
acg agt ggc ttg gac gcg gcg tgc gtg gag cgg ttg gcg cgg acg ggc Thr Ser Gly Leu Asp Ala Ala Ser Val Glu Arg Leu Ala Arg Thr Gly 1605 1610 1615			4848
atc gca gaa ctt tcc acg gag gat gga ctc cgc ctg ttc gat gcc gcg Ile Ala Glu Leu Ser Thr Glu Asp Gly Leu Arg Leu Phe Asp Ala Ala 1620 1625 1630			4896
ttc gcg aag gac cgg gct tgc gtc gtt gcc gct cga ttg gac agg gcg Phe Ala Lys Asp Arg Ala Cys Val Val Ala Ala Arg Leu Asp Arg Ala 1635 1640 1645			4944
ctg ctg gtc ggg aac gga cga tgc cac gcg att ccg gcg ctg ttg agc Leu Leu Val Gly Asn Gly Arg Ser His Ala Ile Pro Ala Leu Leu Ser 1650 1655 1660			4992
gcg ttg gtt cct gtt cgc ggc ggt gtg gcg agg aaa aca gcc aat tct Ala Leu Val Pro Val Arg Gly Gly Val Ala Arg Lys Thr Ala Asn Ser 1665 1670 1675 1680			5040
cag gcc gcg gat gag gac gca ctg ttg ggt ttg gtg cgg gag cac gtt Gln Ala Ala Asp Glu Asp Ala Leu Leu Gly Leu Val Arg Glu His Val 1685 1690 1695			5088

tcg gcc gtg ctg ggt tat tcg ggt gcg gtc gag gtt ggg ggc gac cgt Ser Ala Val Leu Gly Tyr Ser Gly Ala Val Glu Val Gly Gly Asp Arg 1700 1705 1710	5136
gct ttc cgt gat ctg ggt ttt gat tcg ttg tct ggc gtg gag ttg cgg Ala Phe Arg Asp Leu Gly Phe Asp Ser Leu Ser Gly Val Glu Leu Arg 1715 1720 1725	5184
aac cgc ctt gcc ggg gtg ctg ggg gtg cgg ttg ccg gcg act gcg gtg Asn Arg Leu Ala Gly Val Leu Gly Val Arg Leu Pro Ala Thr Ala Val 1730 1735 1740	5232
ttc gac tat ccg acg ccg cgg gcg ctg gcg cgt ttc ctg cat cag gaa Phe Asp Tyr Pro Thr Pro Arg Ala Leu Ala Arg Phe Leu His Gln Glu 1745 1750 1755 1760	5280
ctg gca ggc gag gtc gcg tcc acg tcg acg ccg gtg acc agg gca gcg Leu Ala Gly Glu Val Ala Ser Thr Ser Thr Pro Val Thr Arg Ala Ala 1765 1770 1775	5328
agt gcc gaa gag gat ctt gtt gcg att gtc ggg atg gga tgt cgt ttt Ser Ala Glu Glu Asp Leu Val Ala Ile Val Gly Met Gly Cys Arg Phe 1780 1785 1790	5376
ccg ggt ggg gtg tcg tcg ccg gag gag ctt tgg cgg ctg gtg gcc ggc Pro Gly Gly Val Ser Ser Pro Glu Glu Leu Trp Arg Leu Val Ala Gly 1795 1800 1805	5424
ggc gtg gat gcg gtg gct ggg ttc cca gac gat cgc ggc tgg gat ctc Gly Val Asp Ala Val Ala Gly Phe Pro Asp Asp Arg Gly Trp Asp Leu 1810 1815 1820	5472
gcg gcg ttg tac gat cct gat ccc gat cgt ctc ggg acc tcg tat gtg Ala Ala Leu Tyr Asp Pro Asp Pro Asp Arg Leu Gly Thr Ser Tyr Val 1825 1830 1835 1840	5520
tgt gag ggc ggg ttt ctg cgg gac gcg gcg gag ttc gat gct gac atg Cys Glu Gly Gly Phe Leu Arg Asp Ala Ala Glu Phe Asp Ala Asp Met 1845 1850 1855	5568
ttc ggc atc agc ccg cgt gag gcg ttg gcg atg gat ccg cag cag cgg Phe Gly Ile Ser Pro Arg Glu Ala Leu Ala Met Asp Pro Gln Gln Arg 1860 1865 1870	5616
ttg ctg ctg gag gtc gcc tgg gaa acc ttg gag cgg gct ggg atc gat Leu Leu Leu Glu Val Ala Trp Glu Thr Leu Glu Arg Ala Gly Ile Asp 1875 1880 1885	5664
ccg ttc tcg ttg cac ggc agc cgg acc ggt gtg ttc gcg ggc ttg atg Pro Phe Ser Leu His Gly Ser Arg Thr Gly Val Phe Ala Gly Leu Met 1890 1895 1900	5712
tac cac gac tat ggg gcc cga ttc att acc aga gca ccg gag ggc ttc Tyr His Asp Tyr Gly Ala Arg Phe Ile Thr Arg Ala Pro Glu Gly Phe 1905 1910 1915 1920	5760

gaa ggg cac ctc ggg acg ggc aat gcg ggg agc gtg ctg tcg ggt cgg	5808
Glu Gly His Leu Gly Thr Gly Asn Ala Gly Ser Val Leu Ser Gly Arg	
1925 1930 1935	
ggt gcg tat tcg ttt ggt ttc gag ggt cct gcg gtg acg gtg gat acg	5856
Val Ala Tyr Ser Phe Gly Phe Glu Gly Pro Ala Val Thr Val Asp Thr	
1940 1945 1950	
gcg tgt tcg tcg tcg ttg gtg gcg tta cac ctg gcg ggt caa gca ctg	5904
Ala Cys Ser Ser Ser Leu Val Ala Leu His Leu Ala Gly Gln Ala Leu	
1955 1960 1965	
cgg gcc ggt gag tgc gaa ttc gcc ctt gcc ggt ggc gtc acg gtg atg	5952
Arg Ala Gly Glu Cys Glu Phe Ala Leu Ala Gly Gly Val Thr Val Met	
1970 1975 1980	
tcg acg ccg acg acg ttc gtg gag ttc tcc cgt caa cgg ggt ctg gct	6000
Ser Thr Pro Thr Thr Phe Val Glu Phe Ser Arg Gln Arg Gly Leu Ala	
1985 1990 1995 2000	
ccg gat ggg cgg tgc aag tcg ttc gcg gcg gcc gcg gat ggc acc ggg	6048
Pro Asp Gly Arg Cys Lys Ser Phe Ala Ala Ala Asp Gly Thr Gly	
2005 2010 2015	
tgg ggc gag ggt gcc ggt ctg gtg ttg ctg gag cgg ttg tcg gat gcc	6096
Trp Gly Glu Gly Ala Gly Leu Val Leu Leu Glu Arg Leu Ser Asp Ala	
2020 2025 2030	
cgg cgc aat ggg cac gag gtt ctg gcg gtg gtg cgg ggt agc gcg gtg	6144
Arg Arg Asn Gly His Glu Val Leu Ala Val Val Arg Gly Ser Ala Val	
2035 2040 2045	
aac cag gac ggc gcg tcg aat ggc ttg act gcg cca aat ggt ccg tca	6192
Asn Gln Asp Gly Ala Ser Asn Gly Leu Thr Ala Pro Asn Gly Pro Ser	
2050 2055 2060	
cag caa agg gtg atc acc cag gca ctc acg agt gcc ggg ctg tcc gtg	6240
Gln Gln Arg Val Ile Thr Gln Ala Leu Thr Ser Ala Gly Leu Ser Val	
2065 2070 2075 2080	
tcc gac gtg gat gct gtg gag gcg cat ggg acg ggc acg cgg ctt ggt	6288
Ser Asp Val Asp Ala Val Glu Ala His Gly Thr Gly Thr Arg Leu Gly	
2085 2090 2095	
gat ccg atc gag gcg cag gcg ttg atc gct acg tac ggc cgg gat cgt	6336
Asp Pro Ile Glu Ala Gln Ala Leu Ile Ala Thr Tyr Gly Arg Asp Arg	
2100 2105 2110	
gat ccc ggt cgg ccg ttg tgg ctg ggg tcg gtg aag tcg aat att ggt	6384
Asp Pro Gly Arg Pro Leu Trp Leu Gly Ser Val Lys Ser Asn Ile Gly	
2115 2120 2125	
cac acc cag gcg gcg gcg ggt gtc gct ggt gtg atc aag atg gtg atg	6432
His Thr Gln Ala Ala Ala Gly Val Ala Gly Val Ile Lys Met Val Met	
2130 2135 2140	
gcg atg cgg cag ggg gag ctg ccg cgc acg ttg cac gtg gac gag ccc	6480

Ala Met Arg Gln Gly Glu Leu Pro Arg Thr Leu His Val Asp Glu Pro	2145	2150	2155	2160	
tcc gcg cag gtg gac tgg tct gcg ggc acg gtc caa ctc ctc acg gag	Ser Ala Gln Val Asp Trp Ser Ala Gly Thr Val Gln Leu Leu Thr Glu	2165	2170	2175	6528
aac acg ccc tgg ccc gac agc ggt cgt ctt cgc cgg gcg ggc gtg tca	Asn Thr Pro Trp Pro Asp Ser Gly Arg Leu Arg Arg Ala Gly Val Ser	2180	2185	2190	6576
tcg ttc ggg atc agt ggc acc aac gcg cac ctg atc ctt gaa caa cct	Ser Phe Gly Ile Ser Gly Thr Asn Ala His Leu Ile Leu Glu Gln Pro	2195	2200	2205	6624
ccg cga gag tcg cag cgc tca aca gag ccg gat tcg ggt tct gtc cgc	Pro Arg Glu Ser Gln Arg Ser Thr Glu Pro Asp Ser Gly Ser Val Arg	2210	2215	2220	6672
gat ttt ccg gtg gtg ccg tgg atg gtg tcg ggc aaa aca ccc gaa gcg	Asp Phe Pro Val Val Pro Trp Met Val Ser Gly Lys Thr Pro Glu Ala	2225	2230	2235	6720
cta tcc gcc cag gca gat gca ttg atg tcc tac ttg agc aat cgc gtt	Leu Ser Ala Gln Ala Asp Ala Leu Met Ser Tyr Leu Ser Asn Arg Val	2245	2250	2255	6768
gat gct tcc ccg cga gat atc ggt tat tcg ctt gcg gtg acc cgt ccg	Asp Ala Ser Pro Arg Asp Ile Gly Tyr Ser Leu Ala Val Thr Arg Pro	2260	2265	2270	6816
gcg ttg gac cac cgc gct gtc gtg ctg ggt gcg gat cgt gcc gcg ttg	Ala Leu Asp His Arg Ala Val Val Leu Gly Ala Asp Arg Ala Ala Leu	2275	2280	2285	6864
ctg ccg ggc ttg aaa gcg ctg gcc gtt agt aat gac gct gcc gag gtg	Leu Pro Gly Leu Lys Ala Leu Ala Val Ser Asn Asp Ala Ala Glu Val	2290	2295	2300	6912
atc acc ggc act cgt gcc gct ggg ccg gtc gga ttc gtg ttc tcc ggt	Ile Thr Gly Thr Arg Ala Ala Gly Pro Val Gly Phe Val Phe Ser Gly	2305	2310	2315	6960
caa ggt ggt cag tgg ccc ggg atg gga agc ggg ctc cac tcg gcg ttt	Gln Gly Gly Gln Trp Pro Gly Met Gly Ser Gly Leu His Ser Ala Phe	2325	2330	2335	7008
ccg gtg ttc gcc gac gcg ttt gac gaa gcc tgc tgc gag ctg gat gcg	Pro Val Phe Ala Asp Ala Phe Asp Glu Ala Cys Cys Glu Leu Asp Ala	2340	2345	2350	7056
cat ctc ggg cag atg gcc cgg cta cga gat gtg ttg tcc ggt tcg gat	His Leu Gly Gln Met Ala Arg Leu Arg Asp Val Leu Ser Gly Ser Asp	2355	2360	2365	7104
acg caa ctt ctg gac cag acc ttg tgg gcg cag ccg ggc ctg ttc gcg	Thr Gln Leu Leu Asp Gln Thr Leu Trp Ala Gln Pro Gly Leu Phe Ala				7152

2370	2375	2380	
ttg caa gtc gga ctc tgg gag ttg ttg ggt tgc tgg ggt gtc cgg ccc			7200
Leu Gln Val Gly Leu Trp Glu Leu Leu Gly Ser Trp Gly Val Arg Pro			
2385	2390	2395	2400
gct gtg gtg ctg ggc cac tgc gtc ggt gag ctg gcg gcg gcg ttc gcg			7248
Ala Val Val Leu Leu Gly His Ser Val Gly Glu Leu Ala Ala Ala Phe Ala			
2405	2410	2415	
gct gga gtg ttg tgc ttg cgg gat gcg gct cgg ctg gtg gcg ggc cgt			7296
Ala Gly Val Leu Ser Leu Arg Asp Ala Ala Arg Leu Val Ala Gly Arg			
2420	2425	2430	
gcc cgg ttg atg caa gcc ctg cca act ggc ggt gcc atg ctc gct gcg			7344
Ala Arg Leu Met Gln Ala Leu Pro Thr Gly Gly Ala Met Leu Ala Ala			
2435	2440	2445	
gct gct gga gag gag cag ctg cgc ccg ttg ctg gcc gac tgc ggt gat			7392
Ala Ala Gly Glu Glu Gln Leu Arg Pro Leu Leu Ala Asp Cys Gly Asp			
2450	2455	2460	
cgt gtg ggg atc gcc gcg gtc aac gct ccc ggg tgc gtg gtg ctc tcc			7440
Arg Val Gly Ile Ala Ala Val Asn Ala Pro Gly Ser Val Val Leu Ser			
2465	2470	2475	2480
ggt gat cgg gat gtg ctc gat gac att gcc ggt cgg ctg gac ggg caa			7488
Gly Asp Arg Asp Val Leu Asp Asp Ile Ala Gly Arg Leu Asp Gly Gln			
2485	2490	2495	
ggg atc cgg tcc agg tgg ttg cgg gtt tgc cat gcg ttt cat tgc cat			7536
Gly Ile Arg Ser Arg Trp Leu Arg Val Ser His Ala Phe His Ser His			
2500	2505	2510	
cgg atg gat ccg atg ctg gcg gag ttc acc gaa atc gcc cgg agc gtg			7584
Arg Met Asp Pro Met Leu Ala Glu Phe Thr Glu Ile Ala Arg Ser Val			
2515	2520	2525	
gac tac cgg tgc tca ggg ctg ccg atc gtg tgc acg ttg acg ggt gag			7632
Asp Tyr Arg Ser Ser Gly Leu Pro Ile Val Ser Thr Leu Thr Gly Glu			
2530	2535	2540	
ctc gat gag gtc ggc atg ccg gct acg ccg gag tat tgg gtg cgc cag			7680
Leu Asp Glu Val Gly Met Pro Ala Thr Pro Glu Tyr Trp Val Arg Gln			
2545	2550	2555	2560
gtg cga gaa ccc gtc cgc ttc gcc gac ggt gtt gct gcg ctc gcg gct			7728
Val Arg Glu Pro Val Arg Phe Ala Asp Gly Val Ala Ala Leu Ala Ala			
2565	2570	2575	
cac ggt gtg agc acc gtc gtc gag gtc ggt ccg gat ggg gtg ttg tgc			7776
His Gly Val Ser Thr Val Val Glu Val Gly Pro Asp Gly Val Leu Ser			
2580	2585	2590	
gcg ctg gtg cag gag tgc gcg gcc gga tcc gat cag ggc gga cgg gtg			7824
Ala Leu Val Gln Glu Cys Ala Ala Gly Ser Asp Gln Gly Gly Arg Val			
2595	2600	2605	

gcc gcg gtt ccg ctc atg cgc agc aat cgc gac gag gcg cac acg gtg Ala Ala Val Pro Leu Met Arg Ser Asn Arg Asp Glu Ala His Thr Val 2610 2615 2620	7872
aca acg gca ttg gcg cag atc cat gtg cgt ggt gct gag gtg gac tgg Thr Thr Ala Leu Ala Gln Ile His Val Arg Gly Ala Glu Val Asp Trp 2625 2630 2635 2640	7920
cgg tcg ttt ttc gcc ggt acc ggg gca aag cag gtc gag ctg ccc acg Arg Ser Phe Phe Ala Gly Thr Gly Ala Lys Gln Val Glu Leu Pro Thr 2645 2650 2655	7968
tat gcc ttc caa cga cag cgg tac tgg ctt gac tca cca tcc gaa ccg Tyr Ala Phe Gln Arg Gln Arg Tyr Trp Leu Asp Ser Pro Ser Glu Pro 2660 2665 2670	8016
gtc ggg caa tcc gcc gat ccc gcg cgc cag tcg ggc ttc tgg gaa ctc Val Gly Gln Ser Ala Asp Pro Ala Arg Gln Ser Gly Phe Trp Glu Leu 2675 2680 2685	8064
gtc gag cag gaa gat gtc agc gcg ctc agc gcc gct ctg cac att acc Val Glu Gln Glu Asp Val Ser Ala Leu Ser Ala Ala Leu His Ile Thr 2690 2695 2700	8112
ggc gat cac gac gtg cag gcg tcc ctg gaa tcg gtg gtt ccg gtc ctc Gly Asp His Asp Val Gln Ala Ser Leu Glu Ser Val Val Pro Val Leu 2705 2710 2715 2720	8160
tcc tcc tgg cat cgc cgg atc cgc aac gaa tcc ctg gtg cac cag tgg Ser Ser Trp His Arg Arg Ile Arg Asn Glu Ser Leu Val His Gln Trp 2725 2730 2735	8208
cgg tac cgg att tcc tgg cat gag cgg gca gat ttg cca gac ccc tcg Arg Tyr Arg Ile Ser Trp His Glu Arg Ala Asp Leu Pro Asp Pro Ser 2740 2745 2750	8256
ttg tcg ggg aca tgg ctc gtc gtc gtg ccg gag ggg tgg tcg gcg agt Leu Ser Gly Thr Trp Leu Val Val Pro Glu Gly Trp Ser Ala Ser 2755 2760 2765	8304
cgg caa gtt ctg cgt ttc aac gag atg ttc gag gaa cgg ggt tgc ccg Arg Gln Val Leu Arg Phe Asn Glu Met Phe Glu Glu Arg Gly Cys Pro 2770 2775 2780	8352
gca gtt ctg ttc gag ctc gcc ggg cac gac gag gaa gcc ctg gcg caa Ala Val Leu Phe Glu Leu Ala Gly His Asp Glu Glu Ala Leu Ala Gln 2785 2790 2795 2800	8400
cga ttc cgc tcg ttg cct gtt gcg tca ggg gga ata agc ggc gtg ttg Arg Phe Arg Ser Leu Pro Val Ala Ser Gly Gly Ile Ser Gly Val Leu 2805 2810 2815	8448
tcc ttg ctg gcg ctg gat gaa tcg ccg tcc tcg ccg aac gct gct ttg Ser Leu Leu Ala Leu Asp Glu Ser Pro Ser Ser Pro Asn Ala Ala Leu 2820 2825 2830	8496

ccg aat ggc gcg ctg aac tcg ttg gta ctg ctg cga gct ctg cgg gcc	8544
Pro Asn Gly Ala Leu Asn Ser Leu Val Leu Leu Arg Ala Leu Arg Ala	
2835 2840 2845	
gcg gat gtg tcg gcg cca ttg tgg ttg gcg acg tgt ggt ggt gtc gcg	8592
Ala Asp Val Ser Ala Pro Leu Trp Leu Ala Thr Cys Gly Gly Val Ala	
2850 2855 2860	
gtc ggg gat gtg ccg gtg aac ccg ggg cag gcg ctg gtg tgg gga ctg	8640
Val Gly Asp Val Pro Val Asn Pro Gly Gln Ala Leu Val Trp Gly Leu	
2865 2870 2875 2880	
ggt cgc gtc gtc ggt ctg gag cat ccg gcc tgg tgg ggt ggc ctg gtc	8688
Gly Arg Val Val Gly Leu Glu His Pro Ala Trp Trp Gly Gly Leu Val	
2885 2890 2895	
gac gtg ccg tgc ttg ctc gat gag gac gct cga gaa cgc ttg tcg gtc	8736
Asp Val Pro Cys Leu Leu Asp Glu Asp Ala Arg Glu Arg Leu Ser Val	
2900 2905 2910	
gtg ttg gca ggt ctt ggc gag gac gag atc gcg gta cgt ccc ggt ggt	8784
Val Leu Ala Gly Leu Gly Glu Asp Glu Ile Ala Val Arg Pro Gly Gly	
2915 2920 2925	
gtg ttc gtg ccg ccg ttg gaa cgc gct ggt gcg gcg tcg ggt gcc ggg	8832
Val Phe Val Arg Arg Leu Glu Arg Ala Gly Ala Ala Ser Gly Ala Gly	
2930 2935 2940	
tcg gtg tgg cgt cct ccg ggg acg gtg ttg gtg acg ggt ggt acg ggc	8880
Ser Val Trp Arg Pro Arg Gly Thr Val Leu Val Thr Gly Gly Thr Gly	
2945 2950 2955 2960	
ggt ttg ggg gcg cat gtt gcc ccg tgg ttg gcg ggt gcc ggg gct gag	8928
Gly Leu Gly Ala His Val Ala Arg Trp Leu Ala Gly Ala Gly Ala Glu	
2965 2970 2975	
cat gtg gtg ttg acc agc cgt cga ggc gcg gcg gct ccg ggc gct gga	8976
His Val Val Leu Thr Ser Arg Arg Gly Ala Ala Ala Pro Gly Ala Gly	
2980 2985 2990	
gat ttg ccg gcg gcg gag ctg gag gcg ctg ggc gct ccg gtt tcg atc acg	9024
Asp Leu Arg Ala Glu Leu Glu Ala Leu Gly Ala Arg Val Ser Ile Thr	
2995 3000 3005	
gcc tgc gac gtg gcc gat cgt gac gct ttg gcc gaa gtg ttg gcg acc	9072
Ala Cys Asp Val Ala Asp Arg Asp Ala Leu Ala Glu Val Leu Ala Thr	
3010 3015 3020	
att ccg gat gat tgc ccg ctg acc gcg gtg atg cat gcg gcg ggg gtc	9120
Ile Pro Asp Asp Cys Pro Leu Thr Ala Val Met His Ala Ala Gly Val	
3025 3030 3035 3040	
gtt gaa gtc ggc gac gtg gcg tcg atg tgt ttg acc gac ttc gtt ggg	9168
Val Glu Val Gly Asp Val Ala Ser Met Cys Leu Thr Asp Phe Val Gly	
3045 3050 3055	
gtg ctg tcg gcg aag gca ggt ggt gcg gcg aat ctc gat gag ttg ctc	9216

Val Leu Ser Ala Lys Ala Gly Gly Ala Ala Asn Leu Asp Glu Leu Leu	
3060 3065 3070	
gcc gat gtc gag ctg gat gcc ttc gtg ctg ttc tca tcc gtc tcg ggt	9264
Ala Asp Val Glu Leu Asp Ala Phe Val Leu Phe Ser Ser Val Ser Gly	
3075 3080 3085	
gtg tgg ggt gct ggc ggg cag ggc gct tat gcg gcg gcg aat gcc tac	9312
Val Trp Gly Ala Gly Gly Gln Gly Ala Tyr Ala Ala Ala Asn Ala Tyr	
3090 3095 3100	
ttg gat gcg ttg gcg cag cag cgt cgg gca agg ggg ttg gtg ggg act	9360
Leu Asp Ala Leu Ala Gln Gln Arg Arg Ala Arg Gly Leu Val Gly Thr	
3105 3110 3115 3120	
gcg gtt gcg tgg ggc ccg tgg gcc ggt gac gga atg gcc gca ggt gaa	9408
Ala Val Ala Trp Gly Pro Trp Ala Gly Asp Gly Met Ala Ala Gly Glu	
3125 3130 3135	
ggc ggt gca cag ctg cgc cgg gcc ggc ctg gtg cca atg gct gcg gat	9456
Gly Gly Ala Gln Leu Arg Arg Ala Gly Leu Val Pro Met Ala Ala Asp	
3140 3145 3150	
cgg gcg ttg ctg gca ctt cag ggc gca ttg gat cgt gac gag aca tcc	9504
Arg Ala Leu Leu Ala Leu Gln Gly Ala Leu Asp Arg Asp Glu Thr Ser	
3155 3160 3165	
ctg gtc gtg gcc gat atg gcg tgg gag agg ttc gcc ccg gtg ttc gcc	9552
Leu Val Val Ala Asp Met Ala Trp Glu Arg Phe Ala Pro Val Phe Ala	
3170 3175 3180	
atg tcc cgt cgg cgt ccg ctg ctc gac gag ctg ccc gaa gca cag cag	9600
Met Ser Arg Arg Arg Pro Leu Leu Asp Glu Leu Pro Glu Ala Gln Gln	
3185 3190 3195 3200	
gcg ttg gcg gat gcg gag aac acc act gat gct gcg gac tcg gcc gtc	9648
Ala Leu Ala Asp Ala Glu Asn Thr Thr Asp Ala Ala Asp Ser Ala Val	
3205 3210 3215	
ccg cta ccg cgg ctc gcg ggc atg gca gcc gcc gaa cgc cgc cgc gcg	9696
Pro Leu Pro Arg Leu Ala Gly Met Ala Ala Glu Arg Arg Arg Ala	
3220 3225 3230	
atg ctg gac ctg gtg ctg gcg gag gcc tcg att gtg ttg gga cac aac	9744
Met Leu Asp Leu Val Leu Ala Glu Ala Ser Ile Val Leu Gly His Asn	
3235 3240 3245	
ggg tct gac cca gtt ggt ccc gac cgg gcg ttc cag gag ctc gga ttt	9792
Gly Ser Asp Pro Val Gly Pro Asp Arg Ala Phe Gln Glu Leu Gly Phe	
3250 3255 3260	
gat tcg ctg atg gcc gtc gaa ctg cgc aac agg ttg ggc gag gca aca	9840
Asp Ser Leu Met Ala Val Glu Leu Arg Asn Arg Leu Gly Glu Ala Thr	
3265 3270 3275 3280	
gga ttg agt ctg ccg gcc acg ttg atc ttc gat tat ccg agc cca tcc	9888
Gly Leu Ser Leu Pro Ala Thr Leu Ile Phe Asp Tyr Pro Ser Pro Ser	

3285	3290	3295	
gcg ctg gct gag cag ctg gtc ggc gag ctg gtg gga gcg cag ccc gcg			9936
Ala Leu Ala Glu Gln Leu Val Gly Glu Leu Val Gly Ala Gln Pro Ala			
3300	3305	3310	
acc acc gtc gtg gcc ggg gcc gat cca gtg gat gat ccg gtt gtc gtg			9984
Thr Thr Val Val Ala Gly Ala Asp Pro Val Asp Asp Pro Val Val Val			
3315	3320	3325	
gtc gcg atg gga tgc cgg tat ccg ggc gac gtc tgc tcg ccc gag gag			10032
Val Ala Met Gly Cys Arg Tyr Pro Gly Asp Val Cys Ser Pro Glu Glu			
3330	3335	3340	
ctg tgg cag ctg gtt tct gcg gga cgt gat gcg gta tcg acg ttc ccc			10080
Leu Trp Gln Leu Val Ser Ala Gly Arg Asp Ala Val Ser Thr Phe Pro			
3345	3350	3355	3360
gtc gat ccg ggt tgg gac tgc aac acg ttg ttc gac ccg gat ccg gat			10128
Val Asp Arg Gly Trp Asp Cys Asn Thr Leu Phe Asp Pro Asp Pro Asp			
3365	3370	3375	
ccg gca ggc agt acc tat gtg cga gaa ggt gcc ttc ctg acc ggt gct			10176
Arg Ala Gly Ser Thr Tyr Val Arg Glu Gly Ala Phe Leu Thr Gly Ala			
3380	3385	3390	
gat ccg ttc gac gcc ggg ttc ttc ggc atc agc cct cgc gag gcg cgc			10224
Asp Arg Phe Asp Ala Gly Phe Phe Gly Ile Ser Pro Arg Glu Ala Arg			
3395	3400	3405	
gca atg gat ccg cag cag agg ttg ttg ctc gaa gtg gcg tgg gag gtt			10272
Ala Met Asp Pro Gln Gln Arg Leu Leu Leu Glu Val Ala Trp Glu Val			
3410	3415	3420	
ttc gaa cga gca gga atc gct ccg ctg tcg ttg ccg ggt agc agg acc			10320
Phe Glu Arg Ala Gly Ile Ala Pro Leu Ser Leu Arg Gly Ser Arg Thr			
3425	3430	3435	3440
ggg gtg ttc gcg ggg acc aat ggg cag gac cac ggt gcg aaa gtg gct			10368
Gly Val Phe Ala Gly Thr Asn Gly Gln Asp His Gly Ala Lys Val Ala			
3445	3450	3455	
gcc gcg ccg gag gcg gcg ggt cac ctc ctg acc gga aac gcc gcg agt			10416
Ala Ala Pro Glu Ala Ala Gly His Leu Leu Thr Gly Asn Ala Ala Ser			
3460	3465	3470	
gtc ctg gcc ggc cgg ctt tcc tac acg ttc ggc ctt gag ggg cct gcg			10464
Val Leu Ala Gly Arg Leu Ser Tyr Thr Phe Gly Leu Glu Gly Pro Ala			
3475	3480	3485	
gtg gcg gtg gat acc gcg tgt tcg tcg tcg ttg gtg gcg ttg cat ttg			10512
Val Ala Val Asp Thr Ala Cys Ser Ser Ser Leu Val Ala Leu His Leu			
3490	3495	3500	
gcg tgc cag tcg ctg cgt tcg ggt gag tgt gat atg gcg ttg gca ggt			10560
Ala Cys Gln Ser Leu Arg Ser Gly Glu Cys Asp Met Ala Leu Ala Gly			
3505	3510	3515	3520

ggt gtg acg gtg atg tcg aca ccc ctg gct ttc ctc gag ttc tct cgt	10608
Gly Val Thr Val Met Ser Thr Pro Leu Ala Phe Leu Glu Phe Ser Arg	
3525 3530 3535	
cag cgc ggt ttg gcg cca gat ggt cgg tgc aag tcg ttt gcg gcc gct	10656
Gln Arg Gly Leu Ala Pro Asp Gly Arg Cys Lys Ser Phe Ala Ala Ala	
3540 3545 3550	
gcg gat ggc acc ggg tgg ggt gag ggt gcc ggc ctg gtg ttg ctg gag	10704
Ala Asp Gly Thr Gly Trp Gly Glu Gly Ala Gly Leu Val Leu Leu Glu	
3555 3560 3565	
cgg ttg tcg gat gct cgt cgg aat ggt cac cgg gtg ttg gcc gtg gtt	10752
Arg Leu Ser Asp Ala Arg Arg Asn Gly His Arg Val Leu Ala Val Val	
3570 3575 3580	
cgc ggg tct gcg gtg aat cag gat ggt gcg tcg aat ggc ctg act gcg	10800
Arg Gly Ser Ala Val Asn Gln Asp Gly Ala Ser Asn Gly Leu Thr Ala	
3585 3590 3595 3600	
ccg aat ggt ccg tcg cag cag cgg gtg att cgg cag gcc ctc gcg aat	10848
Pro Asn Gly Pro Ser Gln Gln Arg Val Ile Arg Gln Ala Leu Ala Asn	
3605 3610 3615	
gcg ggg ctg tcg gcg tcc gat gtg gat gtc gtg gag gcg cac ggg acc	10896
Ala Gly Leu Ser Ala Ser Asp Val Asp Val Val Glu Ala His Gly Thr	
' 3620 3625 3630	
ggt acc ggg ctc ggg gat ccg atc gag gcg cag gcg ctg atc gcg aca	10944
Gly Thr Gly Leu Gly Asp Pro Ile Glu Ala Gln Ala Leu Ile Ala Thr	
3635 3640 3645	
tat ggg cag gag cgg gat cct gag cgg gcc ctg tgg ctg ggg tcg atc	10992
Tyr Gly Gln Glu Arg Asp Pro Glu Arg Ala Leu Trp Leu Gly Ser Ile	
3650 3655 3660	
aag tcc aac atc ggc cac acg cag gcg gcg gcc ggt gtg gcg ggg gtc	11040
Lys Ser Asn Ile Gly His Thr Gln Ala Ala Gly Val Ala Gly Val	
3665 3670 3675 3680	
atc aag atg gtg cag gcc atg cgg cac ggg gag ttg cct gcg acg ttg	11088
Ile Lys Met Val Gln Ala Met Arg His Gly Glu Leu Pro Ala Thr Leu	
3685 3690 3695	
cac gtg gac aag ccc act cca cag gtg gac tgg tct gcc ggg gcc gtt	11136
His Val Asp Lys Pro Thr Pro Gln Val Asp Trp Ser Ala Gly Ala Val	
3700 3705 3710	
cgg ctc ctc acc ggg aac acg ccc tgg ccc gag agc ggc cgt cct cgt	11184
Arg Leu Leu Thr Gly Asn Thr Pro Trp Pro Glu Ser Gly Arg Pro Arg	
3715 3720 3725	
cga gcg ggg gtg tcg tcg ttc ggg atc agc ggc acc aac gca cac ctc	11232
Arg Ala Gly Val Ser Ser Phe Gly Ile Ser Gly Thr Asn Ala His Leu	
3730 3735 3740	

atc ctc gaa caa cca ccg tcg gaa cca gcg gag atc gac caa tcg gat Ile Leu Glu Gln Pro Pro Ser Glu Pro Ala Glu Ile Asp Gln Ser Asp 3745 3750 3755 3760	11280
cgg cgg gtc act gcg cat cca gcg gtg atc ccg tgg atg ttg tcg gct Arg Arg Val Thr Ala His Pro Ala Val Ile Pro Trp Met Leu Ser Ala 3765 3770 3775	11328
agg agt ctc gca gcg ctg cag gcc caa gcg gct gcg ctg cag gcc cgg Arg Ser Leu Ala Ala Leu Gln Ala Gln Ala Ala Ala Leu Gln Ala Arg 3780 3785 3790	11376
ctg gac cgg ggt cct ggc gct tct ccg ctg gat ttg ggg tat tca ctc Leu Asp Arg Gly Pro Gly Ala Ser Pro Leu Asp Leu Gly Tyr Ser Leu 3795 3800 3805	11424
gcg acc act cgt tct gtg ctg gac gaa cgc gcc gtc gtg tgg ggt gcc Ala Thr Thr Arg Ser Val Leu Asp Glu Arg Ala Val Val Trp Gly Ala 3810 3815 3820	11472
gat cgg gag gca ctg ctg tcc agg ctg gca gcg ctc gcc gat ggc cgg Asp Arg Glu Ala Leu Leu Ser Arg Leu Ala Ala Leu Ala Asp Gly Arg 3825 3830 3835 3840	11520
acg gcg ccg ggg gtg ata acg ggc tct gcg aat tcc ggt ggc cgc atc Thr Ala Pro Gly Val Ile Thr Gly Ser Ala Asn Ser Gly Gly Arg Ile 3845 3850 3855	11568
gga ttc gtt ttt tcc ggt cag ggc agt cag tgg ctg ggg atg gga aag Gly Phe Val Phe Ser Gly Gln Gly Ser Gln Trp Leu Gly Met Gly Lys 3860 3865 3870	11616
gcg ttg tgc gcg gct ttc ccg gcg ttc gcg gac gcc ttc gag gaa gcc Ala Leu Cys Ala Ala Phe Pro Ala Phe Ala Asp Ala Phe Glu Glu Ala 3875 3880 3885	11664
tgc gac gcg cta agc gca cac ctg ggc gcg gac gtt cgg ggt gtg ctg Cys Asp Ala Leu Ser Ala His Leu Gly Ala Asp Val Arg Gly Val Leu 3890 3895 3900	11712
ttc ggt gct gat gag cag atg ctc gac cgg acg ctg tgg gcg cag tcg Phe Gly Ala Asp Glu Gln Met Leu Asp Arg Thr Leu Trp Ala Gln Ser 3905 3910 3915 3920	11760
ggg atc ttc gcg gtt caa gtc ggc ctc ctg gga ttg ctg agg tcg tgg Gly Ile Phe Ala Val Gln Val Gly Leu Leu Gly Leu Leu Arg Ser Trp 3925 3930 3935	11808
ggc gtg cgg ccg gcc gcg gtg ctg ggg cac tcg gtc ggc gag ttg gct Gly Val Arg Pro Ala Ala Val Leu Gly His Ser Val Gly Glu Leu Ala 3940 3945 3950	11856
gcg gcg cac gcg gct ggt gtg ttg tcc ttg ccg gac gct gca cgg ttg Ala Ala His Ala Ala Gly Val Leu Ser Leu Pro Asp Ala Ala Arg Leu 3955 3960 3965	11904
gtt gcg gct cgg gcc cac ctg atg cag gca ttg ccc acc ggc ggc gca	11952

Val Ala Ala Arg Ala His Leu Met Gln Ala Leu Pro Thr Gly Gly Ala	
3970 3975 3980	
atg ctc gcg gtc gcc acc agc gag gcg gcg gtc gga ccg ctg ctt tcc	12000
Met Leu Ala Val Ala Thr Ser Glu Ala Ala Val Gly Pro Leu Leu Ser	
3985 3990 3995 4000	
ggg gtg tgc gat cgg gtc agc atc gct gcg atc aac ggc ccc gag tgc	12048
Gly Val Cys Asp Arg Val Ser Ile Ala Ala Ile Asn Gly Pro Glu Ser	
4005 4010 4015	
gta gtg ctc tcc ggc gac cgc gat gtg ctc gtg gag ctc gca ggc gaa	12096
Val Val Leu Ser Gly Asp Arg Asp Val Leu Val Glu Leu Ala Gly Glu	
4020 4025 4030	
ttc gat gcc cga ggg ctt agg acc aaa tgg ttg cgg gtc tcc cat gct	12144
Phe Asp Ala Arg Gly Leu Arg Thr Lys Trp Leu Arg Val Ser His Ala	
4035 4040 4045	
ttc cac tcg cac cgg atg gaa ccg att ctg gac gag tac gcg gaa acc	12192
Phe His Ser His Arg Met Glu Pro Ile Leu Asp Glu Tyr Ala Glu Thr	
4050 4055 4060	
gcc agg tgc gtc gag ttc ggt gaa ccg gtg gtg ccg atc gtc tcc gcc	12240
Ala Arg Cys Val Glu Phe Gly Glu Pro Val Val Pro Ile Val Ser Ala	
4065 4070 4075 4080	
gcg acc ggt gcg ctg gac acc acc gga ctg atg tgc gcg gcc gac tac	12288
Ala Thr Gly Ala Leu Asp Thr Thr Gly Leu Met Cys Ala Ala Asp Tyr	
4085 4090 4095	
tgg acg cgc caa gtg cgt gat cct gtc cgc ttc gga gac ggt gtc cgg	12336
Trp Thr Arg Gln Val Arg Asp Pro Val Arg Phe Gly Asp Gly Val Arg	
4100 4105 4110	
gcg ctc gtc ggc caa ggc gtg gac acg atc gtc gag ttc ggc ccg gac	12384
Ala Leu Val Gly Gln Gly Val Asp Thr Ile Val Glu Phe Gly Pro Asp	
4115 4120 4125	
ggg gcg ttg tcg gcc ctg gtc gag cag tgc ttg gcc ggg tcc gac cag	12432
Gly Ala Leu Ser Ala Leu Val Glu Gln Cys Leu Ala Gly Ser Asp Gln	
4130 4135 4140	
gct ggg agg gtg gcg gcg atc ccg ctg atg cgc agg gac cgc gat gag	12480
Ala Gly Arg Val Ala Ala Ile Pro Leu Met Arg Arg Asp Arg Asp Glu	
4145 4150 4155 4160	
gtc gag acc gcg gtg gcg gcc ctg gcg cac gtg cac gtc cgc ggt ggt	12528
Val Glu Thr Ala Val Ala Ala Leu Ala His Val His Val Arg Gly Gly	
4165 4170 4175	
gcg gtg gac tgg tcg gct tgc ttc gcc ggc acc ggc gcc cgc acc gtc	12576
Ala Val Asp Trp Ser Ala Cys Phe Ala Gly Thr Gly Ala Arg Thr Val	
4180 4185 4190	
gag ttg ccc acc tac gcc ttc caa cgc cag cgg tac tgg ctg gcc ggg	12624
Glu Leu Pro Thr Tyr Ala Phe Gln Arg Gln Arg Tyr Trp Leu Ala Gly	

4195	4200	4205	
caa gcg gac ggg cgc ggc ggc gat gtg gtt gcc gac ccg gtc gac gcg Gln Ala Asp Gly Arg Gly Gly Asp Val Val Ala Asp Pro Val Asp Ala 4210 4215 4220			12672
cgc ttc tgg gag ttg gtc gag cgc gcc gat ccg gaa ccg ttg gtg gat Arg Phe Trp Glu Leu Val Glu Arg Ala Asp Pro Glu Pro Leu Val Asp 4225 4230 4235 4240			12720
gaa ctc tgc atc gac cgg gac cag ccc ttc cgg gag gtg ctg ccc gtt Glu Leu Cys Ile Asp Arg Asp Gln Pro Phe Arg Glu Val Leu Pro Val 4245 4250 4255			12768
ctg gct tcc tgg cgc gag aaa caa cgc cag gag gcc ctc gcg gat tcc Leu Ala Ser Trp Arg Glu Lys Gln Arg Gln Glu Ala Leu Ala Asp Ser 4260 4265 4270			12816
tgg cgc tac cag gtg cgc tgg agg tcc gtc gag gtg ccg tcc gca gcc Trp Arg Tyr Gln Val Arg Trp Arg Ser Val Glu Val Pro Ser Ala Ala 4275 4280 4285			12864
gcc ctc cgg ggc gtg tgg ctg gtg gtg ctt cca gct gac gtg ccc cga Ala Leu Arg Gly Val Trp Leu Val Val Leu Pro Ala Asp Val Pro Arg 4290 4295 4300			12912
gat caa ccg gcg gtc gtc atc gac gcg ctg atc gcg cgc ggc gcc gag Asp Gln Pro Ala Val Val Ile Asp Ala Leu Ile Ala Arg Gly Ala Glu 4305 4310 4315 4320			12960
gtc gcg gtc ctg gaa ttg acc gag cag gac ctc caa cgc agt gcg ctt Val Ala Val Leu Glu Leu Thr Glu Gln Asp Leu Gln Arg Ser Ala Leu 4325 4330 4335			13008
gtg gac aag gtg cgc gcc gtc att gcg gac cgc acc gag gtg acg ggt Val Asp Lys Val Arg Ala Val Ile Ala Asp Arg Thr Glu Val Thr Gly 4340 4345 4350			13056
gtg ttg tct ctg ttg gcg atg gac ggc atg ccc tgc gcg gcg cat ccg Val Leu Ser Leu Leu Ala Met Asp Gly Met Pro Cys Ala Ala His Pro 4355 4360 4365			13104
cac ctg tcc cgt ggt gtc gcc gct acc gtg atc ctg acg cag gtg ttg His Leu Ser Arg Gly Val Ala Ala Thr Val Ile Leu Thr Gln Val Leu 4370 4375 4380			13152
ggc gat gcg ggt gtt tcc gcc ccg ctg tgg ctg gcc acg acc ggt ggc Gly Asp Ala Gly Val Ser Ala Pro Leu Trp Leu Ala Thr Thr Gly Gly 4385 4390 4395 4400			13200
gtc gag gcc ggg acc gag gac ggt ccg gcc gat ccg gac cac ggc ttg Val Glu Ala Gly Thr Glu Asp Gly Pro Ala Asp Pro Asp His Gly Leu 4405 4410 4415			13248
atc tgg ggg ctc ggc agg gtc gtc ggc ctt gaa cat ccg cag tgg tgg Ile Trp Gly Leu Gly Arg Val Val Gly Leu Glu His Pro Gln Trp Trp 4420 4425 4430			13296

ggt ggc ctg atc gac ctt ccg gag aca ctg gac gag acg tcc cgg aac	13344
Gly Gly Leu Ile Asp Leu Pro Glu Thr Leu Asp Glu Thr Ser Arg Asn	
4435 4440 4445	
ggg ttg gtg gcc gca ctc gcc ggg acg gcg gcc gaa gat cag ctc gcc	13392
Gly Leu Val Ala Ala Leu Ala Gly Thr Ala Ala Glu Asp Gln Leu Ala	
4450 4455 4460	
gtg cgt tca tcc ggg ttg ttc gtt cgc aga gtg gtg cgc gca gcg cgg	13440
Val Arg Ser Ser Gly Leu Phe Val Arg Arg Val Val Arg Ala Ala Arg	
4465 4470 4475 4480	
aac ccc cgg tca gag aca tgg cgt agc cgg gga acg gtc ctc atc acg	13488
Asn Pro Arg Ser Glu Thr Trp Arg Ser Arg Gly Thr Val Leu Ile Thr	
4485 4490 4495	
ggc gga aca ggc gcg ctc ggt gcc gag gtc gca cga tgg ctg gcc cgg	13536
Gly Gly Thr Gly Ala Leu Gly Ala Glu Val Ala Arg Trp Leu Ala Arg	
4500 4505 4510	
cgg gga gct gag cac ctg gtg ttg atc agt cgc cgc ggc ccg gaa gct	13584
Arg Gly Ala Glu His Leu Val Leu Ile Ser Arg Arg Gly Pro Glu Ala	
4515 4520 4525	
ccc ggc gca gcg gac cta ggg gcc gag ctg act gaa ctc ggc gtg aaa	13632
Pro Gly Ala Ala Asp Leu Gly Ala Glu Leu Thr Glu Leu Gly Val Lys	
4530 4535 4540	
gtc aca gtc ttg gcc tgc gat gtg acg gac cgc gac gag ctg gcg gcg	13680
Val Thr Val Leu Ala Cys Asp Val Thr Asp Arg Asp Glu Leu Ala Ala	
4545 4550 4555 4560	
gtg ctg gcg gcc gtt ccc acg gag tat ccg ctg tcg gcg gtc gtg cac	13728
Val Leu Ala Ala Val Pro Thr Glu Tyr Pro Leu Ser Ala Val Val His	
4565 4570 4575	
acc gcc ggc gtc ggg acg cct gcg aac ctg gcc gag acg acc ttg gcg	13776
Thr Ala Gly Val Gly Thr Pro Ala Asn Leu Ala Glu Thr Thr Leu Ala	
4580 4585 4590	
cag ttc gcc gac gtg ttg tcg gcc aag gtc gtc ggc gcg gcg aac ctg	13824
Gln Phe Ala Asp Val Leu Ser Ala Lys Val Val Gly Ala Ala Asn Leu	
4595 4600 4605	
gac cgg ctg ctt ggc ggg caa ccg ttg gac gcc ttc gtg ctg ttc tcc	13872
Asp Arg Leu Leu Gly Gly Gln Pro Leu Asp Ala Phe Val Leu Phe Ser	
4610 4615 4620	
tcg atc tcg gga gtt tgg gga gcc ggc ggc caa gga gcc tat tcg gcc	13920
Ser Ile Ser Gly Val Trp Gly Ala Gly Gly Gln Gly Ala Tyr Ser Ala	
4625 4630 4635 4640	
gcc aat gcg tat ctc gat gcc ctt gcc gag cgc cga cgg gct tgc ggg	13968
Ala Asn Ala Tyr Leu Asp Ala Leu Ala Glu Arg Arg Arg Ala Cys Gly	
4645 4650 4655	

cgg ccg gcg acg tgc atc gcc tgg ggt ccg tgg gcg ggt gcg ggc atg Arg Pro Ala Thr Cys Ile Ala Trp Gly Pro Trp Ala Gly Ala Gly Met 4660 4665 4670	14016
gcc gtt cag gaa ggt aac gag gcg cat ctc cgc cga agg ggc ctg gta Ala Val Gln Glu Gly Asn Glu Ala His Leu Arg Arg Arg Gly Leu Val 4675 4680 4685	14064
ccg atg gaa ccg cag tcg gcc ctc ttc gcg ctg caa cag gcc ctg tcc Pro Met Glu Pro Gln Ser Ala Leu Phe Ala Leu Gln Gln Ala Leu Ser 4690 4695 4700	14112
caa cga gaa acc gcc atc acc gtc gca gat gtg gac tgg gag cga ttc Gln Arg Glu Thr Ala Ile Thr Val Ala Asp Val Asp Trp Glu Arg Phe 4705 4710 4715 4720	14160
gcc gcc tct ttc acc gcg gcc cgc ccg cga cca ctg ttg gaa gag atc Ala Ala Ser Phe Thr Ala Ala Arg Pro Arg Pro Leu Leu Glu Glu Ile 4725 4730 4735	14208
gtg gat cta cgg ccc gac acc gag acc gag gag aag cac ggt gcc ggc Val Asp Leu Arg Pro Asp Thr Glu Thr Glu Glu Lys His Gly Ala Gly 4740 4745 4750	14256
gag ctg ggg cag cag ctg gcc gca ctg ccg ccc gct gag cgc gga cac Glu Leu Gly Gln Gln Leu Ala Ala Leu Pro Pro Ala Glu Arg Gly His 4755 4760 4765	14304
ctg ctg ctg gag gtg gtg ctg gcg gaa acc gcc agc acc ctg ggg cac Leu Leu Leu Glu Val Val Leu Ala Glu Thr Ala Ser Thr Leu Gly His 4770 4775 4780	14352
gat tcg gcg gag gct gtg caa ccc gat cgg acc ttc gcc gaa ctg ggc Asp Ser Ala Glu Ala Val Gln Pro Asp Arg Thr Phe Ala Glu Leu Gly 4785 4790 4795 4800	14400
ttc gat tcg ctg acc gcg gta gag ctg cgc aac agg ttg aac gcg gtg Phe Asp Ser Leu Thr Ala Val Glu Leu Arg Asn Arg Leu Asn Ala Val 4805 4810 4815	14448
acc ggg ctt cgc ctg ccg ccg acg ctg gtt ttc gac cac ccg acg ccg Thr Gly Leu Arg Leu Pro Pro Thr Leu Val Phe Asp His Pro Thr Pro 4820 4825 4830	14496
ctg gcg ttg tcc gaa cag ttg gtt ccg gcc ctg gtc gcg gag ccg gac Leu Ala Leu Ser Glu Gln Leu Val Pro Ala Leu Val Ala Glu Pro Asp 4835 4840 4845	14544
aac ggc atc gaa tcg ctg ctc gcc gag ctc gac agg ctg gat acc acg Asn Gly Ile Glu Ser Leu Leu Ala Glu Leu Asp Arg Leu Asp Thr Thr 4850 4855 4860	14592
ttg gcg caa ggg cct tcg atc cca ctg gaa gac cag gcc aag gtg gcg Leu Ala Gln Gly Pro Ser Ile Pro Leu Glu Asp Gln Ala Lys Val Ala 4865 4870 4875 4880	14640
gag cgc ttg cac gca ctc ctc gcc aag tgg gac ggg gcg cgt gac ggc 	14688

Glu Arg Leu His Ala Leu Leu Ala Lys Trp Asp Gly Ala Arg Asp Gly
4885 4890 4895

acg gcc aga gcg acg tca ccc caa tcg ctg acg gcg gcc acg gac gac 14736
Thr Ala Arg Ala Thr Ser Pro Gln Ser Leu Thr Ala Ala Thr Asp Asp
4900 4905 4910

gaa atc ttc gac ctc atc gac cgg aag ttc cgg cgc tga 14775
Glu Ile Phe Asp Leu Ile Asp Arg Lys Phe Arg Arg
4915 4920

<210> 48
<211> 4924
<212> PRT
<213> Saccharopolyspora spinosa

<400> 48
Met Ala Asn Glu Glu Lys Leu Phe Gly Tyr Leu Lys Lys Val Thr Ala
1 5 10 15

Asp Leu His Gln Thr Arg Gln Arg Leu Leu Ala Ala Glu Ser Arg Ser
20 25 30

Gln Glu Pro Ile Ala Ile Val Ser Ala Ser Cys Arg Leu Pro Gly Gly
35 40 45

Val Asp Ser Pro Glu Ala Leu Trp Gln Leu Val Arg Thr Gly Thr Asp
50 55 60

Ala Ile Ser Glu Phe Pro Ala Asp Arg Gly Trp Asp Leu Gly Arg Leu
65 70 75 80

Tyr Asp Pro Asp Pro Asn His Gln Gly Thr Ser Tyr Thr Arg Ala Gly
85 90 95

Gly Phe Leu Ala Gly Ala Gly Asp Phe Asp Pro Ala Met Phe Gly Ile
100 105 110

Ser Pro Arg Glu Ala Leu Ala Met Asp Pro Gln Gln Arg Leu Leu Leu
115 120 125

Glu Leu Ser Trp Glu Ala Leu Glu Arg Ala Gly Ile Asp Pro Thr Ser
130 135 140

Leu Arg Gly Ser Lys Thr Gly Val Phe Gly Gly Val Thr Pro Gln Glu
145 150 155 160

Tyr Gly Pro Ser Leu Gln Glu Met Ser Arg Asn Ala Gly Gly Phe Gly
165 170 175

Leu Thr Gly Arg Met Val Ser Val Ala Ser Gly Arg Val Ala Tyr Ser
180 185 190

Phe Gly Phe Glu Gly Pro Ala Val Thr Val Asp Thr Ala Cys Ser Ser
195 200 205

Ser	Leu	Val	Ala	Leu	His	Leu	Ala	Cys	Gln	Ser	Leu	Arg	Ser	Gly	Glu	210	215	220	
Cys	Asp	Leu	Ala	Leu	Ala	Gly	Gly	Val	Thr	Val	Met	Ala	Thr	Pro	Ala	225	230	235	240
Thr	Phe	Val	Glu	Phe	Ser	Arg	Gln	Arg	Gly	Leu	Ala	Pro	Asp	Gly	Arg	245	250	255	
Cys	Lys	Ser	Phe	Ala	Ala	Ala	Ala	Ala	Asp	Gly	Thr	Gly	Trp	Gly	Glu	Gly	260	265	270
Ala	Gly	Leu	Val	Leu	Leu	Glu	Arg	Leu	Ser	Asp	Ala	Arg	Arg	Asn	Gly	275	280	285	
His	Glu	Val	Leu	Ala	Val	Val	Arg	Gly	Ser	Ala	Val	Asn	Gln	Asp	Gly	290	295	300	
Ala	Ser	Asn	Gly	Leu	Thr	Ala	Pro	Asn	Gly	Pro	Ser	Gln	Gln	Arg	Val	305	310	315	320
Ile	Thr	Gln	Ala	Leu	Ala	Ser	Ala	Gly	Leu	Ser	Val	Ser	Asp	Val	Asp	325	330	335	
Ala	Val	Glu	Ala	His	Gly	Thr	Gly	Thr	Thr	Leu	Gly	Asp	Pro	Ile	Glu	340	345	350	
Ala	Gln	Ala	Leu	Ile	Ala	Thr	Tyr	Gly	Gln	Gly	Arg	Glu	Lys	Asp	Arg	355	360	365	
Pro	Leu	Trp	Leu	Gly	Ser	Val	Lys	Ser	Asn	Ile	Gly	His	Thr	Gln	Ala	370	375	380	
Ala	Ala	Gly	Val	Ala	Gly	Val	Ile	Lys	Met	Val	Leu	Ala	Met	Arg	His	385	390	395	400
Gly	Gln	Leu	Pro	Ala	Thr	Leu	His	Val	Asp	Glu	Pro	Thr	Ser	Ala	Val	405	410	415	
Asp	Trp	Ser	Ala	Gly	Ser	Val	Arg	Leu	Leu	Thr	Glu	Asn	Thr	Pro	Trp	420	425	430	
Pro	Asp	Ser	Gly	Arg	Pro	Cys	Arg	Val	Gly	Val	Ser	Ser	Phe	Gly	Ile	435	440	445	
Ser	Gly	Thr	Asn	Ala	His	Val	Ile	Leu	Glu	Gln	Ser	Pro	Val	Glu	Gln	450	455	460	
Gly	Glu	Pro	Ala	Gly	Pro	Val	Glu	Gly	Glu	Arg	Glu	Pro	Asp	Val	Ala	465	470	475	480
Val	Pro	Val	Val	Pro	Trp	Val	Leu	Ser	Gly	Lys	Thr	Pro	Glu	Ala	Ala	485	490	495	
Arg	Ala	Gln	Ala	Glu	Arg	Val	His	Ser	His	Ile	Glu	Asp	Arg	Pro	Gly	500	505	510	

Leu	Ser	Pro	Val	Asp	Val	Ala	Tyr	Ser	Leu	Gly	Met	Thr	Arg	Ala	Ala		
		515					520					525					
Leu	Asp	Glu	Arg	Ala	Val	Val	Leu	Gly	Ser	Asp	Arg	Ala	Ala	Leu	Leu		
		530				535					540						
Thr	Gly	Leu	Arg	Ala	Phe	Ala	Asp	Gly	Cys	Asp	Ala	Pro	Glu	Val	Val		
545					550					555					560		
Ser	Gly	Ser	Val	Gly	Leu	Gly	Gly	Arg	Val	Gly	Phe	Val	Phe	Ser	Gly		
				565					570					575			
Gln	Gly	Gly	Gln	Trp	Pro	Gly	Met	Gly	Arg	Gly	Leu	Tyr	Ser	Val	Phe		
			580					585					590				
Pro	Val	Phe	Ala	Asp	Ala	Phe	Asp	Glu	Ala	Cys	Ala	Glu	Leu	Asp	Ala		
		595					600					605					
His	Leu	Gly	Gln	Glu	Leu	Arg	Val	Arg	Asp	Val	Val	Phe	Gly	Ser	Gln		
	610					615					620						
Ala	Trp	Leu	Leu	Asp	Arg	Thr	Val	Trp	Ala	Gln	Ser	Gly	Leu	Phe	Ala		
625					630					635					640		
Leu	Gln	Ile	Gly	Leu	Leu	Arg	Leu	Leu	Gly	Ser	Trp	Gly	Val	Arg	Pro		
			645						650					655			
Asp	Val	Val	Leu	Gly	His	Ser	Val	Gly	Glu	Leu	Ala	Ala	Val	His	Ala		
			660					665					670				
Ala	Gly	Val	Leu	Ser	Leu	Ser	Glu	Ala	Ala	Arg	Leu	Val	Ala	Gly	Arg		
		675					680					685					
Ala	Arg	Leu	Met	Gln	Ala	Leu	Pro	Ser	Gly	Gly	Ala	Met	Leu	Ala	Val		
	690					695					700						
Ala	Thr	Gly	Glu	Phe	Gln	Val	Asp	Pro	Leu	Leu	Asp	Gly	Val	Arg	Asp		
705					710					715				720			
Arg	Ile	Gly	Ile	Ala	Ala	Val	Asn	Gly	Pro	Glu	Ser	Val	Val	Leu	Ser		
				725					730					735			
Gly	Asp	Arg	Glu	Leu	Leu	Thr	Glu	Ile	Ala	Asp	Arg	Leu	His	Asp	Gln		
			740					745					750				
Gly	Cys	Arg	Thr	Arg	Trp	Leu	Arg	Val	Ser	His	Ala	Phe	His	Ser	Pro		
		755					760					765					
His	Met	Glu	Pro	Met	Leu	Glu	Glu	Phe	Ala	Gln	Ile	Ser	Arg	Gly	Arg		
	770					775					780						
Glu	Tyr	His	Ala	Pro	Glu	Leu	Pro	Ile	Ile	Ser	Thr	Leu	Ile	Gly	Glu		
785					790					795					800		
Leu	Asp	Gly	Gly	Arg	Val	Met	Gly	Thr	Pro	Glu	Tyr	Trp	Val	Arg	Gln		
				805					810					815			

Val	Arg	Glu	Pro	Val	Arg	Phe	Ala	Glu	Gly	Val	Gln	Ala	Leu	Val	Gly
			820						825			830			
Gln	Gly	Val	Gly	Thr	Ile	Val	Glu	Leu	Gly	Pro	Asp	Gly	Ala	Leu	Ser
			835						840			845			
Thr	Leu	Val	Glu	Glu	Cys	Val	Ala	Glu	Ser	Gly	Arg	Val	Ala	Gly	Ile
			850						855			860			
Pro	Leu	Met	Arg	Lys	Asp	Arg	Asp	Glu	Ala	Arg	Thr	Val	Leu	Ala	Ala
			865						870			875			
Leu	Ala	Gln	Ile	His	Thr	Arg	Gly	Gly	Glu	Val	Asp	Trp	Arg	Ser	Phe
			885						890			895			
Phe	Ala	Gly	Thr	Gly	Ala	Lys	Gln	Val	Asp	Leu	Pro	Thr	Tyr	Ala	Phe
			900						905			910			
Gln	Arg	Gln	Arg	Tyr	Trp	Leu	Ala	Ser	Thr	Gly	Arg	Ala	Gly	Asp	Val
			915						920			925			
Thr	Ala	Ala	Gly	Leu	Ala	Glu	Ala	Asp	His	Pro	Leu	Leu	Gly	Ala	Val
			930						935			940			
Val	Ala	Leu	Ala	Asp	Gly	Glu	Gly	Val	Val	Leu	Thr	Gly	Arg	Leu	Thr
			945						950			955			
Ala	Gly	Ser	His	Pro	Trp	Leu	Ser	Asp	His	Arg	Val	Leu	Gly	Glu	Ile
			965						970			975			
Val	Val	Pro	Gly	Thr	Ala	Ile	Val	Glu	Leu	Val	Trp	His	Val	Gly	Glu
			980						985			990			
Arg	Leu	Gly	Cys	Gly	Arg	Val	Glu	Glu	Leu	Ala	Leu	Glu	Ala	Pro	Leu
			995						1000			1005			
Ile	Leu	Pro	Asp	His	Gly	Ala	Val	Gln	Val	Gln	Val	Leu	Val	Gly	Pro
			1010						1015			1020			
Pro	Gly	Glu	Ser	Gly	Ala	Arg	Ser	Val	Ala	Leu	Tyr	Ser	Cys	Pro	Gly
			1025						1030			1035			
Glu	Ala	Ile	Glu	Pro	Glu	Trp	Lys	Lys	His	Ala	Thr	Gly	Val	Leu	Leu
			1045						1050			1055			
Pro	Pro	Val	Ala	Ala	Glu	Asn	His	Glu	Leu	Thr	Ala	Trp	Pro	Pro	Glu
			1060						1065			1070			
Asn	Ala	Thr	Glu	Ile	Asp	Ala	Asp	Gly	Val	Tyr	Ala	Phe	Leu	Glu	Gly
			1075						1080			1085			
His	Gly	Phe	Ala	Tyr	Gly	Pro	Ala	Phe	Arg	Cys	Leu	Arg	Gly	Ala	Trp
			1090						1095			1100			
Arg	Arg	Gly	Gly	Glu	Val	Phe	Ala	Glu	Val	Ala	Leu	Pro	Asp	Asp	Met
			1105						1110			1115			
												1120			

Gln Ala Gly Val Asp Arg Phe Gly Val His Pro Ala Leu Leu Asp Ala
 1125 1130 1135
 Val Leu His Ala Ala Ala Glu Thr Ser Val Val Gln Ser Glu Ala
 1140 1145 1150
 Arg Val Pro Phe Ser Trp Arg Gly Val Glu Leu Arg Ala Thr Glu Ser
 1155 1160 1165
 Ala Val Val Arg Ala Arg Leu Ser Leu Thr Ser Asp Asp Glu Leu Ser
 1170 1175 1180
 Leu Val Ala Val Asp Pro Ala Gly Arg Phe Val Ala Thr Val Asp Ser
 1185 1190 1195 1200
 Leu Val Thr Arg Pro Ile Ser Arg Gln Gln Val Arg Ser Gly Ala Ile
 1205 1210 1215
 Gly Asp Cys Leu Phe Glu Val Glu Trp His Arg Lys Ala Leu Leu Gly
 1220 1225 1230
 Thr Thr Ala Gly Asp Asp Leu Ala Ile Val Gly Asp Gly Pro Ser Trp
 1235 1240 1245
 Pro Glu Ser Val Arg Ala Thr Ala Arg Phe Ala Thr Leu Asp Glu Phe
 1250 1255 1260
 Arg Ala Ala Val Asp Ser Asp Val Pro Ala Pro Gly Ser Val Leu Val
 1265 1270 1275 1280
 Ala Ala Met Ser Ala Glu Glu Val Glu Gly Gly Ser Leu Pro Ser Arg
 1285 1290 1295
 Ala Gln Glu Ser Thr Ser Asp Leu Leu Ala Leu Val Gln Ser Trp Leu
 1300 1305 1310
 Ala Asp Glu Arg Phe Ala Glu Ser Gln Leu Val Val Val Thr Arg Ala
 1315 1320 1325
 Ala Val Ser Ala Asp Ser Asp Ser Asp Val Ala Asp Leu Val Gly Ala
 1330 1335 1340
 Ser Ser Trp Gly Leu Leu Ser Ser Ala Gln Ser Glu Asn Pro Gly Arg
 1345 1350 1355 1360
 Phe Val Leu Val Asp Val Asp Gly Thr Pro Glu Ser Trp Gln Ala Leu
 1365 1370 1375
 Pro Ala Ala Val Arg Ala Gly Glu Pro Gln Leu Ala Leu Arg Arg Gly
 1380 1385 1390
 Val Ala Leu Val Pro Arg Leu Ala Arg Leu Thr Val Arg Glu Glu Gly
 1395 1400 1405
 Ser Ser Pro Gln Leu Asp Thr Asp Gly Thr Val Leu Ile Thr Gly Gly
 1410 1415 1420

Thr Gly Ala Leu Gly Gly Val Val Ala Arg His Leu Val Glu Glu His			
1425	1430	1435	1440
Gly Ile Arg Arg Leu Val Leu Ala Gly Arg Arg Gly Trp Asn Ala Pro			
	1445	1450	1455
Gly Val His Glu Leu Val Asp Glu Leu Ala Arg Ala Gly Ala Val Val			
	1460	1465	1470
Glu Val Val Ala Cys Asp Val Ala Asp Arg Thr Asp Leu Glu His Val			
	1475	1480	1485
Leu Ala Ala Ile Pro Val Asp Trp Pro Leu Arg Gly Ile Val His Thr			
	1490	1495	1500
Ala Gly Val Leu Ala Asp Gly Val Ile Gly Ser Leu Ser Ala Ala Asp			
1505	1510	1515	1520
Val Gly Thr Val Phe Ala Pro Lys Val Thr Gly Ala Trp His Leu His			
	1525	1530	1535
Glu Leu Thr Arg Asp Leu Asp Leu Ser Phe Phe Val Leu Phe Ser Ser			
	1540	1545	1550
Phe Ser Gly Ile Ala Gly Ala Ala Gly Gln Ala Asn Tyr Ala Ala Ala			
	1555	1560	1565
Asn Thr Phe Leu Asp Ala Leu Ala Arg Tyr Arg Arg Ala Arg Gly Leu			
	1570	1575	1580
Pro Gly Leu Ser Leu Ala Trp Gly Leu Trp Ala Gln Pro Ser Gly Met			
1585	1590	1595	1600
Thr Ser Gly Leu Asp Ala Ala Ser Val Glu Arg Leu Ala Arg Thr Gly			
	1605	1610	1615
Ile Ala Glu Leu Ser Thr Glu Asp Gly Leu Arg Leu Phe Asp Ala Ala			
	1620	1625	1630
Phe Ala Lys Asp Arg Ala Cys Val Val Ala Ala Arg Leu Asp Arg Ala			
	1635	1640	1645
Leu Leu Val Gly Asn Gly Arg Ser His Ala Ile Pro Ala Leu Leu Ser			
	1650	1655	1660
Ala Leu Val Pro Val Arg Gly Gly Val Ala Arg Lys Thr Ala Asn Ser			
1665	1670	1675	1680
Gln Ala Ala Asp Glu Asp Ala Leu Leu Gly Leu Val Arg Glu His Val			
	1685	1690	1695
Ser Ala Val Leu Gly Tyr Ser Gly Ala Val Glu Val Gly Gly Asp Arg			
	1700	1705	1710
Ala Phe Arg Asp Leu Gly Phe Asp Ser Leu Ser Gly Val Glu Leu Arg			
	1715	1720	1725

Asn Arg Leu Ala Gly Val Leu Gly Val Arg Leu Pro Ala Thr Ala Val			
1730	1735	1740	
Phe Asp Tyr Pro Thr Pro Arg Ala Leu Ala Arg Phe Leu His Gln Glu			
1745	1750	1755	1760
Leu Ala Gly Glu Val Ala Ser Thr Ser Thr Pro Val Thr Arg Ala Ala			
1765	1770	1775	
Ser Ala Glu Glu Asp Leu Val Ala Ile Val Gly Met Gly Cys Arg Phe			
1780	1785	1790	
Pro Gly Gly Val Ser Ser Pro Glu Glu Leu Trp Arg Leu Val Ala Gly			
1795	1800	1805	
Gly Val Asp Ala Val Ala Gly Phe Pro Asp Asp Arg Gly Trp Asp Leu			
1810	1815	1820	
Ala Ala Leu Tyr Asp Pro Asp Pro Asp Arg Leu Gly Thr Ser Tyr Val			
1825	1830	1835	1840
Cys Glu Gly Gly Phe Leu Arg Asp Ala Ala Glu Phe Asp Ala Asp Met			
1845	1850	1855	
Phe Gly Ile Ser Pro Arg Glu Ala Leu Ala Met Asp Pro Gln Gln Arg			
1860	1865	1870	
Leu Leu Leu Glu Val Ala Trp Glu Thr Leu Glu Arg Ala Gly Ile Asp			
1875	1880	1885	
Pro Phe Ser Leu His Gly Ser Arg Thr Gly Val Phe Ala Gly Leu Met			
1890	1895	1900	
Tyr His Asp Tyr Gly Ala Arg Phe Ile Thr Arg Ala Pro Glu Gly Phe			
1905	1910	1915	1920
Glu Gly His Leu Gly Thr Gly Asn Ala Gly Ser Val Leu Ser Gly Arg			
1925	1930	1935	
Val Ala Tyr Ser Phe Gly Phe Glu Gly Pro Ala Val Thr Val Asp Thr			
1940	1945	1950	
Ala Cys Ser Ser Ser Leu Val Ala Leu His Leu Ala Gly Gln Ala Leu			
1955	1960	1965	
Arg Ala Gly Glu Cys Glu Phe Ala Leu Ala Gly Gly Val Thr Val Met			
1970	1975	1980	
Ser Thr Pro Thr Thr Phe Val Glu Phe Ser Arg Gln Arg Gly Leu Ala			
1985	1990	1995	2000
Pro Asp Gly Arg Cys Lys Ser Phe Ala Ala Ala Asp Gly Thr Gly			
2005	2010	2015	
Trp Gly Glu Gly Ala Gly Leu Val Leu Leu Glu Arg Leu Ser Asp Ala			
2020	2025	2030	

Arg Arg Asn Gly His Glu Val Leu Ala Val Val Arg Gly Ser Ala Val		
2035	2040	2045
Asn Gln Asp Gly Ala Ser Asn Gly Leu Thr Ala Pro Asn Gly Pro Ser		
2050	2055	2060
Gln Gln Arg Val Ile Thr Gln Ala Leu Thr Ser Ala Gly Leu Ser Val		
2065	2070	2075 2080
Ser Asp Val Asp Ala Val Glu Ala His Gly Thr Gly Thr Arg Leu Gly		
2085	2090	2095
Asp Pro Ile Glu Ala Gln Ala Leu Ile Ala Thr Tyr Gly Arg Asp Arg		
2100	2105	2110
Asp Pro Gly Arg Pro Leu Trp Leu Gly Ser Val Lys Ser Asn Ile Gly		
2115	2120	2125
His Thr Gln Ala Ala Ala Gly Val Ala Gly Val Ile Lys Met Val Met		
2130	2135	2140
Ala Met Arg Gln Gly Glu Leu Pro Arg Thr Leu His Val Asp Glu Pro		
2145	2150	2155 2160
Ser Ala Gln Val Asp Trp Ser Ala Gly Thr Val Gln Leu Leu Thr Glu		
2165	2170	2175
Asn Thr Pro Trp Pro Asp Ser Gly Arg Leu Arg Arg Ala Gly Val Ser		
2180	2185	2190
Ser Phe Gly Ile Ser Gly Thr Asn Ala His Leu Ile Leu Glu Gln Pro		
2195	2200	2205
Pro Arg Glu Ser Gln Arg Ser Thr Glu Pro Asp Ser Gly Ser Val Arg		
2210	2215	2220
Asp Phe Pro Val Val Pro Trp Met Val Ser Gly Lys Thr Pro Glu Ala		
2225	2230	2235 2240
Leu Ser Ala Gln Ala Asp Ala Leu Met Ser Tyr Leu Ser Asn Arg Val		
2245	2250	2255
Asp Ala Ser Pro Arg Asp Ile Gly Tyr Ser Leu Ala Val Thr Arg Pro		
2260	2265	2270
Ala Leu Asp His Arg Ala Val Val Leu Gly Ala Asp Arg Ala Ala Leu		
2275	2280	2285
Leu Pro Gly Leu Lys Ala Leu Ala Val Ser Asn Asp Ala Ala Glu Val		
2290	2295	2300
Ile Thr Gly Thr Arg Ala Ala Gly Pro Val Gly Phe Val Phe Ser Gly		
2305	2310	2315 2320
Gln Gly Gly Gln Trp Pro Gly Met Gly Ser Gly Leu His Ser Ala Phe		
2325	2330	2335

Pro Val Phe Ala Asp Ala Phe Asp Glu Ala Cys Cys Glu Leu Asp Ala
 2340 2345 2350
 His Leu Gly Gln Met Ala Arg Leu Arg Asp Val Leu Ser Gly Ser Asp
 2355 2360 2365
 Thr Gln Leu Leu Asp Gln Thr Leu Trp Ala Gln Pro Gly Leu Phe Ala
 2370 2375 2380
 Leu Gln Val Gly Leu Trp Glu Leu Leu Gly Ser Trp Gly Val Arg Pro
 2385 2390 2395 2400
 Ala Val Val Leu Gly His Ser Val Gly Glu Leu Ala Ala Ala Phe Ala
 2405 2410 2415
 Ala Gly Val Leu Ser Leu Arg Asp Ala Ala Arg Leu Val Ala Gly Arg
 2420 2425 2430
 Ala Arg Leu Met Gln Ala Leu Pro Thr Gly Gly Ala Met Leu Ala Ala
 2435 2440 2445
 Ala Ala Gly Glu Glu Gln Leu Arg Pro Leu Leu Ala Asp Cys Gly Asp
 2450 2455 2460
 Arg Val Gly Ile Ala Ala Val Asn Ala Pro Gly Ser Val Val Leu Ser
 2465 2470 2475 2480
 Gly Asp Arg Asp Val Leu Asp Asp Ile Ala Gly Arg Leu Asp Gly Gln
 2485 2490 2495
 Gly Ile Arg Ser Arg Trp Leu Arg Val Ser His Ala Phe His Ser His
 2500 2505 2510
 Arg Met Asp Pro Met Leu Ala Glu Phe Thr Glu Ile Ala Arg Ser Val
 2515 2520 2525
 Asp Tyr Arg Ser Ser Gly Leu Pro Ile Val Ser Thr Leu Thr Gly Glu
 2530 2535 2540
 Leu Asp Glu Val Gly Met Pro Ala Thr Pro Glu Tyr Trp Val Arg Gln
 2545 2550 2555 2560
 Val Arg Glu Pro Val Arg Phe Ala Asp Gly Val Ala Ala Leu Ala Ala
 2565 2570 2575
 His Gly Val Ser Thr Val Val Glu Val Gly Pro Asp Gly Val Leu Ser
 2580 2585 2590
 Ala Leu Val Gln Glu Cys Ala Ala Gly Ser Asp Gln Gly Gly Arg Val
 2595 2600 2605
 Ala Ala Val Pro Leu Met Arg Ser Asn Arg Asp Glu Ala His Thr Val
 2610 2615 2620
 Thr Thr Ala Leu Ala Gln Ile His Val Arg Gly Ala Glu Val Asp Trp
 2625 2630 2635 2640

Arg Ser Phe Phe Ala Gly Thr Gly Ala Lys Gln Val Glu Leu Pro Thr	2645	2650	2655
Tyr Ala Phe Gln Arg Gln Arg Tyr Trp Leu Asp Ser Pro Ser Glu Pro	2660	2665	2670
Val Gly Gln Ser Ala Asp Pro Ala Arg Gln Ser Gly Phe Trp Glu Leu	2675	2680	2685
Val Glu Gln Glu Asp Val Ser Ala Leu Ser Ala Ala Leu His Ile Thr	2690	2695	2700
Gly Asp His Asp Val Gln Ala Ser Leu Glu Ser Val Val Pro Val Leu	2705	2710	2715
Ser Ser Trp His Arg Arg Ile Arg Asn Glu Ser Leu Val His Gln Trp	2725	2730	2735
Arg Tyr Arg Ile Ser Trp His Glu Arg Ala Asp Leu Pro Asp Pro Ser	2740	2745	2750
Leu Ser Gly Thr Trp Leu Val Val Val Pro Glu Gly Trp Ser Ala Ser	2755	2760	2765
Arg Gln Val Leu Arg Phe Asn Glu Met Phe Glu Glu Arg Gly Cys Pro	2770	2775	2780
Ala Val Leu Phe Glu Leu Ala Gly His Asp Glu Glu Ala Leu Ala Gln	2785	2790	2795
Arg Phe Arg Ser Leu Pro Val Ala Ser Gly Gly Ile Ser Gly Val Leu	2805	2810	2815
Ser Leu Leu Ala Leu Asp Glu Ser Pro Ser Ser Pro Asn Ala Ala Leu	2820	2825	2830
Pro Asn Gly Ala Leu Asn Ser Leu Val Leu Leu Arg Ala Leu Arg Ala	2835	2840	2845
Ala Asp Val Ser Ala Pro Leu Trp Leu Ala Thr Cys Gly Gly Val Ala	2850	2855	2860
Val Gly Asp Val Pro Val Asn Pro Gly Gln Ala Leu Val Trp Gly Leu	2865	2870	2875
Gly Arg Val Val Gly Leu Glu His Pro Ala Trp Trp Gly Gly Leu Val	2885	2890	2895
Asp Val Pro Cys Leu Leu Asp Glu Asp Ala Arg Glu Arg Leu Ser Val	2900	2905	2910
Val Leu Ala Gly Leu Gly Glu Asp Glu Ile Ala Val Arg Pro Gly Gly	2915	2920	2925
Val Phe Val Arg Arg Leu Glu Arg Ala Gly Ala Ala Ser Gly Ala Gly	2930	2935	2940

Ser Val Trp Arg Pro Arg Gly Thr Val Leu Val Thr Gly Gly Thr Gly			
2945	2950	2955	2960
Gly Leu Gly Ala His Val Ala Arg Trp Leu Ala Gly Ala Gly Ala Glu			
	2965	2970	2975
His Val Val Leu Thr Ser Arg Arg Gly Ala Ala Ala Pro Gly Ala Gly			
	2980	2985	2990
Asp Leu Arg Ala Glu Leu Glu Ala Leu Gly Ala Arg Val Ser Ile Thr			
	2995	3000	3005
Ala Cys Asp Val Ala Asp Arg Asp Ala Leu Ala Glu Val Leu Ala Thr			
	3010	3015	3020
Ile Pro Asp Asp Cys Pro Leu Thr Ala Val Met His Ala Ala Gly Val			
	3025	3030	3035
Val Glu Val Gly Asp Val Ala Ser Met Cys Leu Thr Asp Phe Val Gly			
	3045	3050	3055
Val Leu Ser Ala Lys Ala Gly Gly Ala Ala Asn Leu Asp Glu Leu Leu			
	3060	3065	3070
Ala Asp Val Glu Leu Asp Ala Phe Val Leu Phe Ser Ser Val Ser Gly			
	3075	3080	3085
Val Trp Gly Ala Gly Gly Gln Gly Ala Tyr Ala Ala Ala Asn Ala Tyr			
	3090	3095	3100
Leu Asp Ala Leu Ala Gln Gln Arg Arg Ala Arg Gly Leu Val Gly Thr			
	3105	3110	3115
Ala Val Ala Trp Gly Pro Trp Ala Gly Asp Gly Met Ala Ala Gly Glu			
	3125	3130	3135
Gly Gly Ala Gln Leu Arg Arg Ala Gly Leu Val Pro Met Ala Ala Asp			
	3140	3145	3150
Arg Ala Leu Leu Ala Leu Gln Gly Ala Leu Asp Arg Asp Glu Thr Ser			
	3155	3160	3165
Leu Val Val Ala Asp Met Ala Trp Glu Arg Phe Ala Pro Val Phe Ala			
	3170	3175	3180
Met Ser Arg Arg Arg Pro Leu Leu Asp Glu Leu Pro Glu Ala Gln Gln			
	3185	3190	3195
Ala Leu Ala Asp Ala Glu Asn Thr Thr Asp Ala Ala Asp Ser Ala Val			
	3205	3210	3215
Pro Leu Pro Arg Leu Ala Gly Met Ala Ala Ala Glu Arg Arg Arg Ala			
	3220	3225	3230
Met Leu Asp Leu Val Leu Ala Glu Ala Ser Ile Val Leu Gly His Asn			
	3235	3240	3245

Gly Ser Asp Pro Val Gly Pro Asp Arg Ala Phe Gln Glu Leu Gly Phe
 3250 3255 3260

Asp Ser Leu Met Ala Val Glu Leu Arg Asn Arg Leu Gly Glu Ala Thr
 3265 3270 3275 3280

Gly Leu Ser Leu Pro Ala Thr Leu Ile Phe Asp Tyr Pro Ser Pro Ser
 3285 3290 3295

Ala Leu Ala Glu Gln Leu Val Gly Glu Leu Val Gly Ala Gln Pro Ala
 3300 3305 3310

Thr Thr Val Val Ala Gly Ala Asp Pro Val Asp Asp Pro Val Val Val
 3315 3320 3325

Val Ala Met Gly Cys Arg Tyr Pro Gly Asp Val Cys Ser Pro Glu Glu
 3330 3335 3340

Leu Trp Gln Leu Val Ser Ala Gly Arg Asp Ala Val Ser Thr Phe Pro
 3345 3350 3355 3360

Val Asp Arg Gly Trp Asp Cys Asn Thr Leu Phe Asp Pro Asp Pro Asp
 3365 3370 3375

Arg Ala Gly Ser Thr Tyr Val Arg Glu Gly Ala Phe Leu Thr Gly Ala
 3380 3385 3390

Asp Arg Phe Asp Ala Gly Phe Phe Gly Ile Ser Pro Arg Glu Ala Arg
 3395 3400 3405

Ala Met Asp Pro Gln Gln Arg Leu Leu Leu Glu Val Ala Trp Glu Val
 3410 3415 3420

Phe Glu Arg Ala Gly Ile Ala Pro Leu Ser Leu Arg Gly Ser Arg Thr
 3425 3430 3435 3440

Gly Val Phe Ala Gly Thr Asn Gly Gln Asp His Gly Ala Lys Val Ala
 3445 3450 3455

Ala Ala Pro Glu Ala Ala Gly His Leu Leu Thr Gly Asn Ala Ala Ser
 3460 3465 3470

Val Leu Ala Gly Arg Leu Ser Tyr Thr Phe Gly Leu Glu Gly Pro Ala
 3475 3480 3485

Val Ala Val Asp Thr Ala Cys Ser Ser Ser Leu Val Ala Leu His Leu
 3490 3495 3500

Ala Cys Gln Ser Leu Arg Ser Gly Glu Cys Asp Met Ala Leu Ala Gly
 3505 3510 3515 3520

Gly Val Thr Val Met Ser Thr Pro Leu Ala Phe Leu Glu Phe Ser Arg
 3525 3530 3535

Gln Arg Gly Leu Ala Pro Asp Gly Arg Cys Lys Ser Phe Ala Ala Ala
 3540 3545 3550

Ala Asp Gly Thr Gly Trp Gly Glu Gly Ala Gly Leu Val Leu Leu Glu
 3555 3560 3565

Arg Leu Ser Asp Ala Arg Arg Asn Gly His Arg Val Leu Ala Val Val
 3570 3575 3580

Arg Gly Ser Ala Val Asn Gln Asp Gly Ala Ser Asn Gly Leu Thr Ala
 3585 3590 3595 3600

Pro Asn Gly Pro Ser Gln Gln Arg Val Ile Arg Gln Ala Leu Ala Asn
 3605 3610 3615

Ala Gly Leu Ser Ala Ser Asp Val Asp Val Val Glu Ala His Gly Thr
 3620 3625 3630

Gly Thr Gly Leu Gly Asp Pro Ile Glu Ala Gln Ala Leu Ile Ala Thr
 3635 3640 3645

Tyr Gly Gln Glu Arg Asp Pro Glu Arg Ala Leu Trp Leu Gly Ser Ile
 3650 3655 3660

Lys Ser Asn Ile Gly His Thr Gln Ala Ala Ala Gly Val Ala Gly Val
 3665 3670 3675 3680

Ile Lys Met Val Gln Ala Met Arg His Gly Glu Leu Pro Ala Thr Leu
 3685 3690 3695

His Val Asp Lys Pro Thr Pro Gln Val Asp Trp Ser Ala Gly Ala Val
 3700 3705 3710

Arg Leu Leu Thr Gly Asn Thr Pro Trp Pro Glu Ser Gly Arg Pro Arg
 3715 3720 3725

Arg Ala Gly Val Ser Ser Phe Gly Ile Ser Gly Thr Asn Ala His Leu
 3730 3735 3740

Ile Leu Glu Gln Pro Pro Ser Glu Pro Ala Glu Ile Asp Gln Ser Asp
 3745 3750 3755 3760

Arg Arg Val Thr Ala His Pro Ala Val Ile Pro Trp Met Leu Ser Ala
 3765 3770 3775

Arg Ser Leu Ala Ala Leu Gln Ala Gln Ala Ala Ala Leu Gln Ala Arg
 3780 3785 3790

Leu Asp Arg Gly Pro Gly Ala Ser Pro Leu Asp Leu Gly Tyr Ser Leu
 3795 3800 3805

Ala Thr Thr Arg Ser Val Leu Asp Glu Arg Ala Val Val Trp Gly Ala
 3810 3815 3820

Asp Arg Glu Ala Leu Leu Ser Arg Leu Ala Ala Leu Ala Asp Gly Arg
 3825 3830 3835 3840

Thr Ala Pro Gly Val Ile Thr Gly Ser Ala Asn Ser Gly Gly Arg Ile
 3845 3850 3855

Gly Phe Val Phe Ser Gly Gln Gly Ser Gln Trp Leu Gly Met Gly Lys
 3860 3865 3870
 Ala Leu Cys Ala Ala Phe Pro Ala Phe Ala Asp Ala Phe Glu Glu Ala
 3875 3880 3885
 Cys Asp Ala Leu Ser Ala His Leu Gly Ala Asp Val Arg Gly Val Leu
 3890 3895 3900
 Phe Gly Ala Asp Glu Gln Met Leu Asp Arg Thr Leu Trp Ala Gln Ser
 3905 3910 3915 3920
 Gly Ile Phe Ala Val Gln Val Gly Leu Leu Gly Leu Leu Arg Ser Trp
 3925 3930 3935
 Gly Val Arg Pro Ala Ala Val Leu Gly His Ser Val Gly Glu Leu Ala
 3940 3945 3950
 Ala Ala His Ala Ala Gly Val Leu Ser Leu Pro Asp Ala Ala Arg Leu
 3955 3960 3965
 Val Ala Ala Arg Ala His Leu Met Gln Ala Leu Pro Thr Gly Gly Ala
 3970 3975 3980
 Met Leu Ala Val Ala Thr Ser Glu Ala Ala Val Gly Pro Leu Leu Ser
 3985 3990 3995 4000
 Gly Val Cys Asp Arg Val Ser Ile Ala Ala Ile Asn Gly Pro Glu Ser
 4005 4010 4015
 Val Val Leu Ser Gly Asp Arg Asp Val Leu Val Glu Leu Ala Gly Glu
 4020 4025 4030
 Phe Asp Ala Arg Gly Leu Arg Thr Lys Trp Leu Arg Val Ser His Ala
 4035 4040 4045
 Phe His Ser His Arg Met Glu Pro Ile Leu Asp Glu Tyr Ala Glu Thr
 4050 4055 4060
 Ala Arg Cys Val Glu Phe Gly Glu Pro Val Val Pro Ile Val Ser Ala
 4065 4070 4075 4080
 Ala Thr Gly Ala Leu Asp Thr Thr Gly Leu Met Cys Ala Ala Asp Tyr
 4085 4090 4095
 Trp Thr Arg Gln Val Arg Asp Pro Val Arg Phe Gly Asp Gly Val Arg
 4100 4105 4110
 Ala Leu Val Gly Gln Gly Val Asp Thr Ile Val Glu Phe Gly Pro Asp
 4115 4120 4125
 Gly Ala Leu Ser Ala Leu Val Glu Gln Cys Leu Ala Gly Ser Asp Gln
 4130 4135 4140
 Ala Gly Arg Val Ala Ala Ile Pro Leu Met Arg Arg Asp Arg Asp Glu
 4145 4150 4155 4160

Val Glu Thr Ala Val Ala Ala Leu Ala His Val His Val Arg Gly Gly	4165	4170	4175	
Ala Val Asp Trp Ser Ala Cys Phe Ala Gly Thr Gly Ala Arg Thr Val	4180	4185	4190	
Glu Leu Pro Thr Tyr Ala Phe Gln Arg Gln Arg Tyr Trp Leu Ala Gly	4195	4200	4205	
Gln Ala Asp Gly Arg Gly Gly Asp Val Val Ala Asp Pro Val Asp Ala	4210	4215	4220	
Arg Phe Trp Glu Leu Val Glu Arg Ala Asp Pro Glu Pro Leu Val Asp	4225	4230	4235	4240
Glu Leu Cys Ile Asp Arg Asp Gln Pro Phe Arg Glu Val Leu Pro Val	4245	4250	4255	
Leu Ala Ser Trp Arg Glu Lys Gln Arg Gln Glu Ala Leu Ala Asp Ser	4260	4265	4270	
Trp Arg Tyr Gln Val Arg Trp Arg Ser Val Glu Val Pro Ser Ala Ala	4275	4280	4285	
Ala Leu Arg Gly Val Trp Leu Val Val Leu Pro Ala Asp Val Pro Arg	4290	4295	4300	
Asp Gln Pro Ala Val Val Ile Asp Ala Leu Ile Ala Arg Gly Ala Glu	4305	4310	4315	4320
Val Ala Val Leu Glu Leu Thr Glu Gln Asp Leu Gln Arg Ser Ala Leu	4325	4330	4335	
Val Asp Lys Val Arg Ala Val Ile Ala Asp Arg Thr Glu Val Thr Gly	4340	4345	4350	
Val Leu Ser Leu Leu Ala Met Asp Gly Met Pro Cys Ala Ala His Pro	4355	4360	4365	
His Leu Ser Arg Gly Val Ala Ala Thr Val Ile Leu Thr Gln Val Leu	4370	4375	4380	
Gly Asp Ala Gly Val Ser Ala Pro Leu Trp Leu Ala Thr Thr Gly Gly	4385	4390	4395	4400
Val Glu Ala Gly Thr Glu Asp Gly Pro Ala Asp Pro Asp His Gly Leu	4405	4410	4415	
Ile Trp Gly Leu Gly Arg Val Val Gly Leu Glu His Pro Gln Trp Trp	4420	4425	4430	
Gly Gly Leu Ile Asp Leu Pro Glu Thr Leu Asp Glu Thr Ser Arg Asn	4435	4440	4445	
Gly Leu Val Ala Ala Leu Ala Gly Thr Ala Ala Glu Asp Gln Leu Ala	4450	4455	4460	

Val Arg Ser Ser Gly Leu Phe Val Arg Arg Val Val Arg Ala Ala Arg
4465 4470 4475 4480
Asn Pro Arg Ser Glu Thr Trp Arg Ser Arg Gly Thr Val Leu Ile Thr
4485 4490 4495
Gly Gly Thr Gly Ala Leu Gly Ala Glu Val Ala Arg Trp Leu Ala Arg
4500 4505 4510
Arg Gly Ala Glu His Leu Val Leu Ile Ser Arg Arg Gly Pro Glu Ala
4515 4520 4525
Pro Gly Ala Ala Asp Leu Gly Ala Glu Leu Thr Glu Leu Gly Val Lys
4530 4535 4540
Val Thr Val Leu Ala Cys Asp Val Thr Asp Arg Asp Glu Leu Ala Ala
4545 4550 4555 4560
Val Leu Ala Ala Val Pro Thr Glu Tyr Pro Leu Ser Ala Val Val His
4565 4570 4575
Thr Ala Gly Val Gly Thr Pro Ala Asn Leu Ala Glu Thr Thr Leu Ala
4580 4585 4590
Gln Phe Ala Asp Val Leu Ser Ala Lys Val Val Gly Ala Ala Asn Leu
4595 4600 4605
Asp Arg Leu Leu Gly Gly Gln Pro Leu Asp Ala Phe Val Leu Phe Ser
4610 4615 4620
Ser Ile Ser Gly Val Trp Gly Ala Gly Gly Gln Gly Ala Tyr Ser Ala
4625 4630 4635 4640
Ala Asn Ala Tyr Leu Asp Ala Leu Ala Glu Arg Arg Arg Ala Cys Gly
4645 4650 4655
Arg Pro Ala Thr Cys Ile Ala Trp Gly Pro Trp Ala Gly Ala Gly Met
4660 4665 4670
Ala Val Gln Glu Gly Asn Glu Ala His Leu Arg Arg Arg Gly Leu Val
4675 4680 4685
Pro Met Glu Pro Gln Ser Ala Leu Phe Ala Leu Gln Gln Ala Leu Ser
4690 4695 4700
Gln Arg Glu Thr Ala Ile Thr Val Ala Asp Val Asp Trp Glu Arg Phe
4705 4710 4715 4720
Ala Ala Ser Phe Thr Ala Ala Arg Pro Arg Pro Leu Leu Glu Glu Ile
4725 4730 4735
Val Asp Leu Arg Pro Asp Thr Glu Thr Glu Glu Lys His Gly Ala Gly
4740 4745 4750
Glu Leu Gly Gln Gln Leu Ala Ala Leu Pro Pro Ala Glu Arg Gly His
4755 4760 4765

Leu Leu Leu Glu Val Val Leu Ala Glu Thr Ala Ser Thr Leu Gly His
 4770 4775 4780
 Asp Ser Ala Glu Ala Val Gln Pro Asp Arg Thr Phe Ala Glu Leu Gly
 4785 4790 4795 4800
 Phe Asp Ser Leu Thr Ala Val Glu Leu Arg Asn Arg Leu Asn Ala Val
 4805 4810 4815
 Thr Gly Leu Arg Leu Pro Pro Thr Leu Val Phe Asp His Pro Thr Pro
 4820 4825 4830
 Leu Ala Leu Ser Glu Gln Leu Val Pro Ala Leu Val Ala Glu Pro Asp
 4835 4840 4845
 Asn Gly Ile Glu Ser Leu Leu Ala Glu Leu Asp Arg Leu Asp Thr Thr
 4850 4855 4860
 Leu Ala Gln Gly Pro Ser Ile Pro Leu Glu Asp Gln Ala Lys Val Ala
 4865 4870 4875 4880
 Glu Arg Leu His Ala Leu Leu Ala Lys Trp Asp Gly Ala Arg Asp Gly
 4885 4890 4895
 Thr Ala Arg Ala Thr Ser Pro Gln Ser Leu Thr Ala Ala Thr Asp Asp
 4900 4905 4910
 Glu Ile Phe Asp Leu Ile Asp Arg Lys Phe Arg Arg
 4915 4920

<210> 49
 <211> 16767
 <212> DNA
 <213> Saccharopolyspora spinosa

<220>
 <221> CDS
 <222> (1)..(16764)
 <223> ORF22; polyketide synthase

<400> 49
 atg gcc aat gaa gaa aag ctc cgc gag tac ctc aag cgt gtc gtc gtc 48
 Met Ala Asn Glu Glu Lys Leu Arg Glu Tyr Leu Lys Arg Val Val Val
 1 5 10 15
 gaa ctg gaa gag gcg cac gaa cgc ctg cac gag ttg gag cgc cag gag 96
 Glu Leu Glu Glu Ala His Glu Arg Leu His Glu Leu Glu Arg Gln Glu
 20 25 30
 cac gac ccc atc gcg atc gtg tcg atg gga tgt cgt tat ccc ggt ggc 144
 His Asp Pro Ile Ala Ile Val Ser Met Gly Cys Arg Tyr Pro Gly Gly
 35 40 45
 gtc tcc act ccg gag gag ctg tgg cga ctg gtc gtc gac gga gga gac 192
 Val Ser Thr Pro Glu Glu Leu Trp Arg Leu Val Val Asp Gly Gly Asp

50	55	60	
gcg atc gcg aac ttc ccc gaa gac cgt ggc tgg aat ctg gac gag ctg			240
Ala Ile Ala Asn Phe Pro Glu Asp Arg Gly Trp Asn Leu Asp Glu Leu			
65	70	75	80
ttc gat cct gat ccg ggc cga gcc ggg acc tcc tac gtc cgc gag ggt			288
Phe Asp Pro Asp Pro Gly Arg Ala Gly Thr Ser Tyr Val Arg Glu Gly			
	85	90	95
ggt ttc ctg cgc ggg gtc gcg gac ttc gat gcc ggg ctc ttc ggg atc			336
Gly Phe Leu Arg Gly Val Ala Asp Phe Asp Ala Gly Leu Phe Gly Ile			
	100	105	110
agt ccg cgc gag gca cag gcg atg gac ccg caa cag cgg ttg ctg ctg			384
Ser Pro Arg Glu Ala Gln Ala Met Asp Pro Gln Gln Arg Leu Leu Leu			
	115	120	125
gag atc tcg tgg gag gtg ttc gag cgc gcc ggc att gac ccg ttt tct			432
Glu Ile Ser Trp Glu Val Phe Glu Arg Ala Gly Ile Asp Pro Phe Ser			
	130	135	140
ttg cgg ggt acc aag acc ggt gtg ttc gcg ggc ctg atc tac cac gac			480
Leu Arg Gly Thr Lys Thr Gly Val Phe Ala Gly Leu Ile Tyr His Asp			
145	150	155	160
tac gcg tcg cgg ttt cgc aag acc ccc gcg gag ttc gag ggt tac ttc			528
Tyr Ala Ser Arg Phe Arg Lys Thr Pro Ala Glu Phe Glu Gly Tyr Phe			
	165	170	175
gcc acc ggc aac gcg ggc agc gtc gca tcc ggc cgg gtg gct tac acc			576
Ala Thr Gly Asn Ala Gly Ser Val Ala Ser Gly Arg Val Ala Tyr Thr			
	180	185	190
ttc ggg tta gag ggc ccg gcg gtc acc gtg gac acc gcc tgc tcg tcg			624
Phe Gly Leu Glu Gly Pro Ala Val Thr Val Asp Thr Ala Cys Ser Ser			
	195	200	205
tcc ctg gtg gcg ctg cac ctg gcc tgc cag tcc ctg cgg ctg ggc gaa			672
Ser Leu Val Ala Leu His Leu Ala Cys Gln Ser Leu Arg Leu Gly Glu			
	210	215	220
tgc gac ctg gcc ctg gcc ggt ggc att tcg gtg atg gcc acg ccg gga			720
Cys Asp Leu Ala Leu Ala Gly Gly Ile Ser Val Met Ala Thr Pro Gly			
225	230	235	240
gcc ttc gtc gag ttc agc cgg caa cgc gca ctc gcc tcg gat ggc cgg			768
Ala Phe Val Glu Phe Ser Arg Gln Arg Ala Leu Ala Ser Asp Gly Arg			
	245	250	255
tgc aag ccc ttc gcg gat gcc gcc gac ggc acc ggc tgg ggc gag ggc			816
Cys Lys Pro Phe Ala Asp Ala Ala Asp Gly Thr Gly Trp Gly Glu Gly			
	260	265	270
gcc gga atg ctg ctg ctg gaa cgg ctg tcg gac gca cga cga aac ggc			864
Ala Gly Met Leu Leu Leu Glu Arg Leu Ser Asp Ala Arg Arg Asn Gly			
	275	280	285

cac ccg gtg ctg gcg gcg gtg gtc ggt tcc gcg atc aac cag gac ggg	912
His Pro Val Leu Ala Ala Val Val Gly Ser Ala Ile Asn Gln Asp Gly	
290 295 300	
acg tcc aac ggc ctg acc gcg ccc agc ggt ccc gca cag cag cga gtg	960
Thr Ser Asn Gly Leu Thr Ala Pro Ser Gly Pro Ala Gln Gln Arg Val	
305 310 315 320	
atc cgc caa gcc ctg gcg aac gcc ggg ttg tcg ccc gcc gag gtc gat	1008
Ile Arg Gln Ala Leu Ala Asn Ala Gly Leu Ser Pro Ala Glu Val Asp	
325 330 335	
gtg gtc gag gcg cac ggc acg ggc acg gcc ttg ggc gac ccg atc gag	1056
Val Val Glu Ala His Gly Thr Gly Thr Ala Leu Gly Asp Pro Ile Glu	
340 345 350	
gcg cag gcc ctg atc gcc acc tac ggg gcg aac cgg tcg gcg gat cat	1104
Ala Gln Ala Leu Ile Ala Thr Tyr Gly Ala Asn Arg Ser Ala Asp His	
355 360 365	
ccg ctg ctg ctg ggt tcc ctc aag tcg aac atc ggc cac acc cag gct	1152
Pro Leu Leu Leu Gly Ser Leu Lys Ser Asn Ile Gly His Thr Gln Ala	
370 375 380	
gcc gcc ggt gtg gcc ggg gtg atc aag tcg gtc ctg gcc atc agg cac	1200
Ala Ala Gly Val Ala Gly Val Ile Lys Ser Val Leu Ala Ile Arg His	
385 390 395 400	
cgg gag atg ccc cgc agc ctg cac atc gac cag cca tcg cag cac gtg	1248
Arg Glu Met Pro Arg Ser Leu His Ile Asp Gln Pro Ser Gln His Val	
405 410 415	
gac tgg tcg gcg ggc gcg gtg cgg ctg ctc acg gac agc gtt gac tgg	1296
Asp Trp Ser Ala Gly Ala Val Arg Leu Leu Thr Asp Ser Val Asp Trp	
420 425 430	
ccg gat ctc ggc agg ccg cgc cga gca ggg gtg tcc tcg ttc ggc atg	1344
Pro Asp Leu Gly Arg Pro Arg Arg Ala Gly Val Ser Ser Phe Gly Met	
435 440 445	
agc ggt acc aac gca cac ctg atc gtc gag gaa gta tcc gac gag ccg	1392
Ser Gly Thr Asn Ala His Leu Ile Val Glu Glu Val Ser Asp Glu Pro	
450 455 460	
gtc tcg ggc agt acc gag ccg acc ggg gca ttt ccc tgg ccg ctg tcc	1440
Val Ser Gly Ser Thr Glu Pro Thr Gly Ala Phe Pro Trp Pro Leu Ser	
465 470 475 480	
ggc aag acg gag acg gca ttg cgc gag cag gct gcc gag ttg ctc tcc	1488
Gly Lys Thr Glu Thr Ala Leu Arg Glu Gln Ala Ala Glu Leu Leu Ser	
485 490 495	
gta gtg acc gag cac ccg gag ccg gga ctg ggg gac gtc ggg tac tcg	1536
Val Val Thr Glu His Pro Glu Pro Gly Leu Gly Asp Val Gly Tyr Ser	
500 505 510	

ctg gcc acc ggt cgc gct gcg atg gag cac cgg gct gtc gtg gtt gcc	1584
Leu Ala Thr Gly Arg Ala Ala Met Glu His Arg Ala Val Val Val Ala	
515 520 525	
gac gat cgg gac tct ttc gtc gcc gga ctg acg gcg ttg gct gcg ggc	1632
Asp Asp Arg Asp Ser Phe Val Ala Gly Leu Thr Ala Leu Ala Ala Gly	
530 535 540	
gtt ccg gca gcc aac gtg gtg cag ggc gcg gcc gac tgc aag gga aag	1680
Val Pro Ala Ala Asn Val Val Gln Gly Ala Ala Asp Cys Lys Gly Lys	
545 550 555 560	
gtc gcg ttc gtg ttc ccc ggc cag ggc tcg cat tgg cag ggg atg gcg	1728
Val Ala Phe Val Phe Pro Gly Gln Gly Ser His Trp Gln Gly Met Ala	
565 570 575	
agg gaa ctg tcc gaa tcc tcg ccg gtg ttc cgg cgg aag ctg gcg gaa	1776
Arg Glu Leu Ser Glu Ser Ser Pro Val Phe Arg Arg Lys Leu Ala Glu	
580 585 590	
tgc gcg gcg gct acg gcc cct tac gtg gac tgg tcg ctg ctc ggc gtc	1824
Cys Ala Ala Ala Thr Ala Pro Tyr Val Asp Trp Ser Leu Leu Gly Val	
595 600 605	
ctt cgc ggt gat ccc gat gca ccc gcg ctg gat cgc gac gac gtg att	1872
Leu Arg Gly Asp Pro Asp Ala Pro Ala Leu Asp Arg Asp Asp Val Ile	
610 615 620	
cag ctc gcg ctg ttc gcc atg atg gtg tcg ctg gcc gaa ctg tgg cgt	1920
Gln Leu Ala Leu Phe Ala Met Met Val Ser Leu Ala Glu Leu Trp Arg	
625 630 635 640	
tcg tgc gga gtg gag ccc gcc gcg gtg gtc ggt cat tcc cag ggc gag	1968
Ser Cys Gly Val Glu Pro Ala Ala Val Val Gly His Ser Gln Gly Glu	
645 650 655	
atc gcc gcc gcc cat gtg gca ggc gct ttg tcc ttg act gat gcg gtg	2016
Ile Ala Ala Ala His Val Ala Gly Ala Leu Ser Leu Thr Asp Ala Val	
660 665 670	
cgc atc atc gct gcc cgc tgc gat gcg gtg tcg gcg ctg acc ggg aag	2064
Arg Ile Ile Ala Ala Arg Cys Asp Ala Val Ser Ala Leu Thr Gly Lys	
675 680 685	
gga ggc atg ctc gcg att gcc ttg ccg gaa agc gcg gtg gtg aag cga	2112
Gly Gly Met Leu Ala Ile Ala Leu Pro Glu Ser Ala Val Val Lys Arg	
690 695 700	
atc gca ggc ctg ccg gag ctg acc gtt gcg gcg gtc aac gga ccc ggc	2160
Ile Ala Gly Leu Pro Glu Leu Thr Val Ala Ala Val Asn Gly Pro Gly	
705 710 715 720	
tcc act gtc gtt tcc ggc gaa ccg tcg gct ctg gag cgt ctg cag acc	2208
Ser Thr Val Val Ser Gly Glu Pro Ser Ala Leu Glu Arg Leu Gln Thr	
725 730 735	
gaa ctg acc gcg gaa aac gtg cag acc cgg cgg gtg gga att gat tac	2256

Glu	Leu	Thr	Ala	Glu	Asn	Val	Gln	Thr	Arg	Arg	Val	Gly	Ile	Asp	Tyr	
			740					745					750			
gcc	tcg	cat	tcg	ccg	cag	atc	gcg	cag	gtc	cag	ggc	cgg	ctt	ctg	gac	2304
Ala	Ser	His	Ser	Pro	Gln	Ile	Ala	Gln	Val	Gln	Gly	Arg	Leu	Leu	Asp	
		755					760				765					
cgg	ctg	ggc	gaa	gtc	ggg	tcc	gaa	cct	gct	gag	atc	gct	ttc	tac	tcg	2352
Arg	Leu	Gly	Glu	Val	Gly	Ser	Glu	Pro	Ala	Glu	Ile	Ala	Phe	Tyr	Ser	
	770					775					780					
acg	gtc	acc	ggc	gag	cgg	acg	gac	acc	ggc	cga	ctc	gac	gcc	gac	tac	2400
Thr	Val	Thr	Gly	Glu	Arg	Thr	Asp	Thr	Gly	Arg	Leu	Asp	Ala	Asp	Tyr	
	785				790				795						800	
tgg	tac	cag	aac	ctt	cgg	cag	ccc	gtc	cgc	ttc	cag	cag	acc	gtc	gcc	2448
Trp	Tyr	Gln	Asn	Leu	Arg	Gln	Pro	Val	Arg	Phe	Gln	Gln	Thr	Val	Ala	
			805						810					815		
cgg	atg	gca	gat	cag	ggc	tat	cgg	ttc	ttc	gtc	gag	gtg	agc	ccg	cac	2496
Arg	Met	Ala	Asp	Gln	Gly	Tyr	Arg	Phe	Phe	Val	Glu	Val	Ser	Pro	His	
			820					825					830			
ccg	ctg	ctc	acc	gcc	gga	atc	cag	gaa	acg	ctg	gaa	gcc	gcg	gac	gcg	2544
Pro	Leu	Leu	Thr	Ala	Gly	Ile	Gln	Glu	Thr	Leu	Glu	Ala	Ala	Asp	Ala	
		835					840					845				
ggc	ggg	gtg	gtg	gtc	ggg	tcg	ctg	cgg	cgt	ggc	gag	ggc	ggc	tcc	cgg	2592
Gly	Gly	Val	Val	Val	Gly	Ser	Leu	Arg	Arg	Gly	Glu	Gly	Gly	Ser	Arg	
	850					855					860					
cgc	tgg	ctg	act	tcg	ctg	gcc	gag	tgc	cag	gtg	cgc	gga	ctg	ccg	gtg	2640
Arg	Trp	Leu	Thr	Ser	Leu	Ala	Glu	Cys	Gln	Val	Arg	Gly	Leu	Pro	Val	
	865				870					875					880	
aat	tgg	gaa	cag	gta	ttc	ctc	aac	acc	gga	gcc	cga	cgc	gtg	ccg	ctg	2688
Asn	Trp	Glu	Gln	Val	Phe	Leu	Asn	Thr	Gly	Ala	Arg	Arg	Val	Pro	Leu	
				885					890					895		
ccg	acc	tac	ccg	ttc	cag	cgg	cag	cgg	tac	tgg	ttg	gag	tcc	gcc	gag	2736
Pro	Thr	Tyr	Pro	Phe	Gln	Arg	Gln	Arg	Tyr	Trp	Leu	Glu	Ser	Ala	Glu	
			900					905					910			
tac	gac	gcg	ggc	gat	ctc	ggg	tcg	gtg	ggc	ttg	ctc	tcc	gcc	gag	cat	2784
Tyr	Asp	Ala	Gly	Asp	Leu	Gly	Ser	Val	Gly	Leu	Leu	Ser	Ala	Glu	His	
		915					920					925				
ccc	ctg	ctc	ggg	gct	gcg	gtg	acg	ctg	gcc	gat	gcg	ggc	ggg	ttc	ctg	2832
Pro	Leu	Leu	Gly	Ala	Ala	Val	Thr	Leu	Ala	Asp	Ala	Gly	Gly	Phe	Leu	
	930					935					940					
ctg	acc	ggc	aag	ctg	tcg	gtc	aag	acc	cag	ccc	tgg	ttg	gcc	gac	cac	2880
Leu	Thr	Gly	Lys	Leu	Ser	Val	Lys	Thr	Gln	Pro	Trp	Leu	Ala	Asp	His	
	945				950				955						960	
gtg	gtc	ggc	ggg	gcg	atc	ctg	ctg	ccc	ggc	acc	gcg	ttc	gtg	gaa	atg	2928
Val	Val	Gly	Gly	Ala	Ile	Leu	Leu	Pro	Gly	Thr	Ala	Phe	Val	Glu	Met	

965	970	975	
ctg ata cgc gcc gcg gac cag gtc ggg tgc gat ctg atc gag gag ttg			2976
Leu Ile Arg Ala Asp Gln Val Gly Cys Asp Leu Ile Glu Glu Leu			
980	985	990	
tcc ctg acg act ccg ctg gtt ttg ccc gcg acc ggt gcg gtg cag gtg			3024
Ser Leu Thr Thr Pro Leu Val Leu Pro Ala Thr Gly Ala Val Gln Val			
995	1000	1005	
cag atc gcg gtt ggc ggt ccg gac gag gcc ggg cgc cgc tcg gtc cgc			3072
Gln Ile Ala Val Gly Gly Pro Asp Glu Ala Gly Arg Arg Ser Val Arg			
1010	1015	1020	
gtg cat tcc tgt cga gac gac gcc gtg ccg cag gac tcg tgg acc tgc			3120
Val His Ser Cys Arg Asp Asp Ala Val Pro Gln Asp Ser Trp Thr Cys			
1025	1030	1035	1040
cac gcg acc ggc acg ttg acc tcc agc gat cac cag gac gcc ggc cag			3168
His Ala Thr Gly Thr Leu Thr Ser Ser Asp His Gln Asp Ala Gly Gln			
1045	1050	1055	
ggc ccc gat ggg att tgg ccg ccc aac gat gct gtc gcg gtt ccg ctg			3216
Gly Pro Asp Gly Ile Trp Pro Pro Asn Asp Ala Val Ala Val Pro Leu			
1060	1065	1070	
gac agc ttc tac gcc cgc gca gct gag cgg ggc ttc gat ttc ggc ccg			3264
Asp Ser Phe Tyr Ala Arg Ala Ala Glu Arg Gly Phe Asp Phe Gly Pro			
1075	1080	1085	
gcg ttc cag ggg ttg cag gcg gct tgg aag cgc gga gac gag atc ttc			3312
Ala Phe Gln Gly Leu Gln Ala Ala Trp Lys Arg Gly Asp Glu Ile Phe			
1090	1095	1100	
gcc gag gtc ggc ctg ccc acc gca cac cgc gaa gac gcc ggc agg ttc			3360
Ala Glu Val Gly Leu Pro Thr Ala His Arg Glu Asp Ala Gly Arg Phe			
1105	1110	1115	1120
gga atc cac cct gct ctg ctg gat gcg gca ctg cag gcg ctg ggc gca			3408
Gly Ile His Pro Ala Leu Leu Asp Ala Ala Leu Gln Ala Leu Gly Ala			
1125	1130	1135	
gcc gaa gag gat ccg gac gag gga tgg ctc ccg ttc gcg tgg caa ggt			3456
Ala Glu Glu Asp Pro Asp Glu Gly Trp Leu Pro Phe Ala Trp Gln Gly			
1140	1145	1150	
gtg tcc ctc aaa gcg acg ggc gca ctt tcc ctt cgg gtg cac ctc gtt			3504
Val Ser Leu Lys Ala Thr Gly Ala Leu Ser Leu Arg Val His Leu Val			
1155	1160	1165	
ccg gcg ggc gcg aat gcg gtg tcg gtg ttc acg acc gac acg act ggc			3552
Pro Ala Gly Ala Asn Ala Val Ser Val Phe Thr Thr Asp Thr Thr Gly			
1170	1175	1180	
caa gcc gtg ctc tcc atc gat tcg ctg gtg ctg cgc cag att tcg gac			3600
Gln Ala Val Leu Ser Ile Asp Ser Leu Val Leu Arg Gln Ile Ser Asp			
1185	1190	1195	1200

aag cag ttg gca gcg gcc cgt gcg atg gaa cac gag tcc ctg ttc cgg	3648
Lys Gln Leu Ala Ala Arg Ala Met Glu His Glu Ser Leu Phe Arg	
1205 1210 1215	
gtc gac tgg aag cga atc tcg ccc ggc gct gcc aag ccg gtc tcc tgg	3696
Val Asp Trp Lys Arg Ile Ser Pro Gly Ala Ala Lys Pro Val Ser Trp	
1220 1225 1230	
gca gtg atc ggc aat gac gaa ctc gcc cga gcc tgc ggc tcg gca ctt	3744
Ala Val Ile Gly Asn Asp Glu Leu Ala Arg Ala Cys Gly Ser Ala Leu	
1235 1240 1245	
ggc acg gaa ctc cac ccc gac ctg acc ggg ttg gct gac ccg ccc ccg	3792
Gly Thr Glu Leu His Pro Asp Leu Thr Gly Leu Ala Asp Pro Pro Pro	
1250 1255 1260	
gac gtc gtg gtg gtg cca tgc ggt gcg tct cgc cag gac ttg gac gtt	3840
Asp Val Val Val Val Pro Cys Gly Ala Ser Arg Gln Asp Leu Asp Val	
1265 1270 1275 1280	
gct tcc gag gca cgt gcc gcg aca caa cgc atg ctt gac ctg atc cag	3888
Ala Ser Glu Ala Arg Ala Ala Thr Gln Arg Met Leu Asp Leu Ile Gln	
1285 1290 1295	
gat tgg ttg gcg gcg gcg cga ttc gcc gga tct cgc ctg gtg gtt gtg	3936
Asp Trp Leu Ala Ala Ala Arg Phe Ala Gly Ser Arg Leu Val Val Val	
1300 1305 1310	
acg tgt ggt gcg gcg tcg aca ggt ccc gcc gag ggt gtt tcc gac ctg	3984
Thr Cys Gly Ala Ala Ser Thr Gly Pro Ala Glu Gly Val Ser Asp Leu	
1315 1320 1325	
gtg cat gct gcg tcg tgg ggt ttg ttg cgt tcg gcg cag tcg gag aac	4032
Val His Ala Ala Ser Trp Gly Leu Leu Arg Ser Ala Gln Ser Glu Asn	
1330 1335 1340	
ccg gac cga ttc gtg ttg gtc gat gtg gac gga acc gcc gaa tca tgg	4080
Pro Asp Arg Phe Val Leu Val Asp Val Asp Gly Thr Ala Glu Ser Trp	
1345 1350 1355 1360	
cgt gcg ctc gcg gcg gcc gtg cgt tcc gga gaa ccg cag ctg gcg ttg	4128
Arg Ala Leu Ala Ala Ala Val Arg Ser Gly Glu Pro Gln Leu Ala Leu	
1365 1370 1375	
cgc gcc ggt gaa gtc cgg gtg cct cgc ctg gcg cga tgt gtt gcc gcc	4176
Arg Ala Gly Glu Val Arg Val Pro Arg Leu Ala Arg Cys Val Ala Ala	
1380 1385 1390	
gag gac agc cgg atc cca gtg ccc ggt gcg gat ggg acg gtg ttg att	4224
Glu Asp Ser Arg Ile Pro Val Pro Gly Ala Asp Gly Thr Val Leu Ile	
1395 1400 1405	
tcc ggc ggt acg ggc ctg ctg ggc ggg ttg gtt gcc cgg cat ttg gtg	4272
Ser Gly Gly Thr Gly Leu Leu Gly Gly Leu Val Ala Arg His Leu Val	
1410 1415 1420	

gcg gag cgc ggt gtc cgc cgc ctg gtg ctc gcg ggg cga cgc ggc tgg	4320
Ala Glu Arg Gly Val Arg Arg Leu Val Leu Ala Gly Arg Arg Gly Trp	
1425 1430 1435 1440	
agc gcc ccc ggg gtc acc gac ctg gtg gat gag ttg gtg ggc ctg gga	4368
Ser Ala Pro Gly Val Thr Asp Leu Val Asp Glu Leu Val Gly Leu Gly	
1445 1450 1455	
gct gcg gtc gag gtg gcg agc tgc gat gtc ggg gat cgg gcc cag ttg	4416
Ala Ala Val Glu Val Ala Ser Cys Asp Val Gly Asp Arg Ala Gln Leu	
1460 1465 1470	
gac cgg ctg ctg acg acg atc tcg gca gag ttc ccg ctg cgc gga gtg	4464
Asp Arg Leu Leu Thr Thr Ile Ser Ala Glu Phe Pro Leu Arg Gly Val	
1475 1480 1485	
gtg cat gcg gcc ggg gca ctt gcc gac ggg gtc gtc gag tcg ctg aca	4512
Val His Ala Ala Gly Ala Leu Ala Asp Gly Val Val Glu Ser Leu Thr	
1490 1495 1500	
cca gag cac gtg gca aag gtg ttc ggc ccg aag gcc gcc ggt gcg tgg	4560
Pro Glu His Val Ala Lys Val Phe Gly Pro Lys Ala Ala Gly Ala Trp	
1505 1510 1515 1520	
cac ctg cac gag ttg act ctt gat ctg gat ctc tcg ttc ttc gtg ctc	4608
His Leu His Glu Leu Thr Leu Asp Leu Asp Leu Ser Phe Phe Val Leu	
1525 1530 1535	
ttc tcc tcg ttc tcc ggc gtg gcg ggg gct gcg ggt cag gga aac tac	4656
Phe Ser Ser Phe Ser Gly Val Ala Gly Ala Ala Gly Gln Gly Asn Tyr	
1540 1545 1550	
gcg gcg gcg aac gcg ttc ctg gac ggc ctg gct cag cac cgg cgg acg	4704
Ala Ala Ala Asn Ala Phe Leu Asp Gly Leu Ala Gln His Arg Arg Thr	
1555 1560 1565	
gcg ggg ctg cct gcg gtg tcg ctg gct tgg ggc ttg tgg gag cag ccc	4752
Ala Gly Leu Pro Ala Val Ser Leu Ala Trp Gly Leu Trp Glu Gln Pro	
1570 1575 1580	
agc ggg atg acc gga gcg ctc gat gcg gcg ggc cgt agc cgc att gcg	4800
Ser Gly Met Thr Gly Ala Leu Asp Ala Ala Gly Arg Ser Arg Ile Ala	
1585 1590 1595 1600	
cgc acc aat ccg ccg atg tcc gcg ccg gac ggg ttg cgg ctg ttc gag	4848
Arg Thr Asn Pro Pro Met Ser Ala Pro Asp Gly Leu Arg Leu Phe Glu	
1605 1610 1615	
atg gcg ttt cgc gtt ccg ggc gaa tcg ctt ctg gtt ccg gtc cac gtc	4896
Met Ala Phe Arg Val Pro Gly Glu Ser Leu Leu Val Pro Val His Val	
1620 1625 1630	
gac ctg aac gcc ctg cgc gct gat gcg gcc gac ggc ggt gtg cct gcg	4944
Asp Leu Asn Ala Leu Arg Ala Asp Ala Ala Asp Gly Gly Val Pro Ala	
1635 1640 1645	
ttg ttg cgc gac ctg gtg cca gcg ccc gtg cgg cgg agc gcg gtc aac	4992

Leu Leu Arg Asp Leu Val Pro Ala Pro Val Arg Arg Ser Ala Val Asn	
1650 1655 1660	
gag tcg gcg gac gtc aac ggt ctg gtt ggt cgg ctg cgg agg ctg ccg	5040
Glu Ser Ala Asp Val Asn Gly Leu Val Gly Arg Leu Arg Arg Leu Pro	
1665 1670 1675 1680	
gac ctg gat cag gaa acc cag ctg ttg ggt ttg gtg cgc gag cat gtt	5088
Asp Leu Asp Gln Glu Thr Gln Leu Leu Gly Leu Val Arg Glu His Val	
1685 1690 1695	
tcg gcg gtg ctg ggg cat tcg ggt gcg gtc gag gtc ggg gcc gat cgt	5136
Ser Ala Val Leu Gly His Ser Gly Ala Val Glu Val Gly Ala Asp Arg	
1700 1705 1710	
gct ttc cgg gat ttg ggt ttt gat tcg ttg tcc ggt gtg gag ttt cgg	5184
Ala Phe Arg Asp Leu Gly Phe Asp Ser Leu Ser Gly Val Glu Phe Arg	
1715 1720 1725	
aac cgg ctt ggc ggg gtg ctg ggc gtt cgg ttg ccg gct act gcg gtg	5232
Asn Arg Leu Gly Gly Val Leu Gly Val Arg Leu Pro Ala Thr Ala Val	
1730 1735 1740	
ttc gac tat ccg aca ccg cgg gcg ttg gtt cgg ttc ttg ctc gac aaa	5280
Phe Asp Tyr Pro Thr Pro Arg Ala Leu Val Arg Phe Leu Leu Asp Lys	
1745 1750 1755 1760	
ctg att ggt ggc gtg gag gct ccg act ccc gca ccg gcg gct gtg gcg	5328
Leu Ile Gly Gly Val Glu Ala Pro Thr Pro Ala Pro Ala Ala Val Ala	
1765 1770 1775	
gcg gtg act gct gac gat ccc gtt gtg atc gtg ggg atg ggc tgt cgt	5376
Ala Val Thr Ala Asp Asp Pro Val Val Ile Val Gly Met Gly Cys Arg	
1780 1785 1790	
tat ccg ggt ggg gtg tcc tcg ccg gag gag ctt tgg cgt ttg gtg gcc	5424
Tyr Pro Gly Gly Val Ser Ser Pro Glu Glu Leu Trp Arg Leu Val Ala	
1795 1800 1805	
ggg ggc ttg gat gcg gtg gcg gag ttc ccg gac gat cgt ggc tgg gat	5472
Gly Gly Leu Asp Ala Val Ala Glu Phe Pro Asp Asp Arg Gly Trp Asp	
1810 1815 1820	
cag gcg ggg ttg ttc gat ccg gat ccc gat cgt ctt ggg acc tcg tat	5520
Gln Ala Gly Leu Phe Asp Pro Asp Pro Asp Arg Leu Gly Thr Ser Tyr	
1825 1830 1835 1840	
gtg tgt gag ggt ggc ttc ctg cga gat gcg gca gag ttc gat gcc ggt	5568
Val Cys Glu Gly Gly Phe Leu Arg Asp Ala Ala Glu Phe Asp Ala Gly	
1845 1850 1855	
ttc ttc ggg att tcc ccg cgt gag gcg ttg gcg atg gat ccg cag cag	5616
Phe Phe Gly Ile Ser Pro Arg Glu Ala Leu Ala Met Asp Pro Gln Gln	
1860 1865 1870	
cgg ttg ctg ctg gaa gtc gct tgg gaa acc gtg gag cgg gcg ggg att	5664
Arg Leu Leu Leu Glu Val Ala Trp Glu Thr Val Glu Arg Ala Gly Ile	

1875	1880	1885	
gat ccg ctt tcg ttg cgg ggg agc cgg acc ggc gtg ttc gcg ggg ctg Asp Pro Leu Ser Leu Arg Gly Ser Arg Thr Gly Val Phe Ala Gly Leu 1890 1895 1900			5712
atg cac cac gac tac ggc gcg cgg ttc atc acg agg gcg ccg gag ggt Met His His Asp Tyr Gly Ala Arg Phe Ile Thr Arg Ala Pro Glu Gly 1905 1910 1915 1920			5760
ttc gag ggt tat cta ggt aat ggc agc gcg gga ggc gtg ttt tcg ggt Phe Glu Gly Tyr Leu Gly Asn Gly Ser Ala Gly Gly Val Phe Ser Gly 1925 1930 1935			5808
cgg gtt gcg tat tcg ttt ggt ttc gag ggt cct gcg gtg acg gtg gat Arg Val Ala Tyr Ser Phe Gly Phe Glu Gly Pro Ala Val Thr Val Asp 1940 1945 1950			5856
acg gcg tgt tcg tcg tcg ttg gtg gcg ctg cac ctg gcg ggt caa gca Thr Ala Cys Ser Ser Ser Leu Val Ala Leu His Leu Ala Gly Gln Ala 1955 1960 1965			5904
ctg cgg tct ggt gag tgt gat ctg gct ctt gcg ggt ggt gtg acg gtg Leu Arg Ser Gly Glu Cys Asp Leu Ala Leu Ala Gly Gly Val Thr Val 1970 1975 1980			5952
atg gcc acg ccg ggg atg ttc gtg gag ttt tcg cgt caa ccg ggc ttg Met Ala Thr Pro Gly Met Phe Val Glu Phe Ser Arg Gln Arg Gly Leu 1985 1990 1995 2000			6000
gcg gcg gat ggg ccg tgc aag tcg ttt gcg gcg gct gcg gat ggc acc Ala Ala Asp Gly Arg Cys Lys Ser Phe Ala Ala Ala Ala Asp Gly Thr 2005 2010 2015			6048
ggt tgg gga gaa ggc gcg ggc ttg gtg ttg ttg gag ccg ctg tcg gat Gly Trp Gly Glu Gly Ala Gly Leu Val Leu Leu Glu Arg Leu Ser Asp 2020 2025 2030			6096
gcc ccg cgc aac ggg cac gcg gtt ctg gcg gtc gtg ccg ggt agc gcg Ala Arg Arg Asn Gly His Ala Val Leu Ala Val Val Arg Gly Ser Ala 2035 2040 2045			6144
gtg aat cag gat ggt gcg tcg aat ggt ttg acg gcg ccg aat ggg ccc Val Asn Gln Asp Gly Ala Ser Asn Gly Leu Thr Ala Pro Asn Gly Pro 2050 2055 2060			6192
tcg cag cag ccg gtg atc acg cag gcg ttg gcg agt gct ggt ttg tcg Ser Gln Gln Arg Val Ile Thr Gln Ala Leu Ala Ser Ala Gly Leu Ser 2065 2070 2075 2080			6240
gtg tct gat gtg gac gcc gtg gag gcg cat ggg act gga acc agg ctt Val Ser Asp Val Asp Ala Val Glu Ala His Gly Thr Gly Thr Arg Leu 2085 2090 2095			6288
ggt gat ccg att gag gcg cag gct ctg att gcc act tac ggg cag ggg Gly Asp Pro Ile Glu Ala Gln Ala Leu Ile Ala Thr Tyr Gly Gln Gly 2100 2105 2110			6336

cgg gat agc gat cgg ccg ttg tgg ttg ggg tcg gtg aag tcg aat att Arg Asp Ser Asp Arg Pro Leu Trp Leu Gly Ser Val Lys Ser Asn Ile 2115 2120 2125	6384
ggt cat acg cag gcg gcg gcg ggt gtc gct ggt gtg atc aag atg gtg Gly His Thr Gln Ala Ala Ala Gly Val Ala Gly Val Ile Lys Met Val 2130 2135 2140	6432
atg gcg atg cgg cac ggg cag ctg ccc gcg acg ttg cat gtg gat gaa Met Ala Met Arg His Gly Gln Leu Pro Ala Thr Leu His Val Asp Glu 2145 2150 2155 2160	6480
cct acg tcg gaa gtg gat tgg tcg gcg ggg gat gtc cag ctc ctc acg Pro Thr Ser Glu Val Asp Trp Ser Ala Gly Asp Val Gln Leu Leu Thr 2165 2170 2175	6528
gag aac acc ccc tgg ccc ggc aac agc cat cct cgg cgg gtg ggc gtg Glu Asn Thr Pro Trp Pro Gly Asn Ser His Pro Arg Arg Val Gly Val 2180 2185 2190	6576
tcg tcg ttc ggg atc agc ggc acc aac gca cac gtc atc ctc gaa caa Ser Ser Phe Gly Ile Ser Gly Thr Asn Ala His Val Ile Leu Glu Gln 2195 2200 2205	6624
gcc tcg aaa aca cca gac gag act gcg gac aag agc ggt ccc gat tcg Ala Ser Lys Thr Pro Asp Glu Thr Ala Asp Lys Ser Gly Pro Asp Ser 2210 2215 2220	6672
gaa tcg acc gtg gac ctt cca gcg gtc ccg ttg atc gtg tcg ggg aga Glu Ser Thr Val Asp Leu Pro Ala Val Pro Leu Ile Val Ser Gly Arg 2225 2230 2235 2240	6720
aca ccg gca gcg ctc agc gct cag gcg agc gca ttg ttg tcc tat ttg Thr Pro Ala Ala Leu Ser Ala Gln Ala Ser Ala Leu Leu Ser Tyr Leu 2245 2250 2255	6768
ggt gag cgt ggc gat att tcc acg ctg gat gcg gcg ttt tcg ttg gct Gly Glu Arg Gly Asp Ile Ser Thr Leu Asp Ala Ala Phe Ser Leu Ala 2260 2265 2270	6816
tcc tcc cgg gcc gcg ttg gag gag ccg gcg gtg gtg ctg gga gcg gac Ser Ser Arg Ala Ala Leu Glu Glu Arg Ala Val Val Leu Gly Ala Asp 2275 2280 2285	6864
cgc gaa acg ttg ttg tcc ggg ttg gaa gcg ctg gct tcc ggt cgc gag Arg Glu Thr Leu Leu Ser Gly Leu Glu Ala Leu Ala Ser Gly Arg Glu 2290 2295 2300	6912
gct tct ggg gtg gtg tcg gga tcc ccg gtc tct ggc ggg gtt ggg ttc Ala Ser Gly Val Val Ser Gly Ser Pro Val Ser Gly Gly Val Gly Phe 2305 2310 2315 2320	6960
gtg ttc gcc ggt cag ggc gga cag tgg ttg ggg atg ggc cgg ggg ctc Val Phe Ala Gly Gln Gly Gly Gln Trp Leu Gly Met Gly Arg Gly Leu 2325 2330 2335	7008

tac tcg gtt ttt ccg gtg ttc gct gac gcg ttt gac gaa gca tgt gcc	7056
Tyr Ser Val Phe Pro Val Phe Ala Asp Ala Phe Asp Glu Ala Cys Ala	
2340 2345 2350	
gga ctg gac gcg cat ctg ggg cag gac gtg ggg gtc cgg gat gtg gtg	7104
Gly Leu Asp Ala His Leu Gly Gln Asp Val Gly Val Arg Asp Val Val	
2355 2360 2365	
ttt ggt tcc gac ggg tcc ttg ttg gat cgg acg ctg tgg gcc cag tcg	7152
Phe Gly Ser Asp Gly Ser Leu Leu Asp Arg Thr Leu Trp Ala Gln Ser	
2370 2375 2380	
ggt ttg ttc gcg ttg cag gtt ggt ttg ctg agc ctg ctg ggt tcg tgg	7200
Gly Leu Phe Ala Leu Gln Val Gly Leu Leu Ser Leu Leu Gly Ser Trp	
2385 2390 2395 2400	
ggt gtc cgg ccg ggt gtg gtg ctg ggc cat tcg gtc ggc gag ttc gcg	7248
Gly Val Arg Pro Gly Val Val Leu Gly His Ser Val Gly Glu Phe Ala	
2405 2410 2415	
gcg gcg gtt gcg gcg gga gtg ttg tcg ttg ccg gat gcg gct cgg atg	7296
Ala Ala Val Ala Ala Gly Val Leu Ser Leu Pro Asp Ala Ala Arg Met	
2420 2425 2430	
gtg gcg ggt cgt gcc cgg ttg atg cag gcg ttg cct tct ggc ggt gcc	7344
Val Ala Gly Arg Ala Arg Leu Met Gln Ala Leu Pro Ser Gly Gly Ala	
2435 2440 2445	
atg ttg gcg gtg gct gct ggt gag gag cag ctg cgg ccg ttg ttg gcc	7392
Met Leu Ala Val Ala Ala Gly Glu Glu Gln Leu Arg Pro Leu Leu Ala	
2450 2455 2460	
gat cgg gtt gat ggt gcg ggt atc gcc gcg gtc aac gct cct gag tcg	7440
Asp Arg Val Asp Gly Ala Gly Ile Ala Ala Val Asn Ala Pro Glu Ser	
2465 2470 2475 2480	
gtg gtg ctc tcc ggc gat cgg gag gtg ctt gac gac atc gcc ggc gcg	7488
Val Val Leu Ser Gly Asp Arg Glu Val Leu Asp Asp Ile Ala Gly Ala	
2485 2490 2495	
ctg gat ggg caa ggg att cgg tgg cgg cgg ttg cgg gtt tcg cat gcg	7536
Leu Asp Gly Gln Gly Ile Arg Trp Arg Arg Leu Arg Val Ser His Ala	
2500 2505 2510	
ttt cat tcg tat cgg atg gac ccg atg ttg cag gag ttc gcc gaa atc	7584
Phe His Ser Tyr Arg Met Asp Pro Met Leu Gln Glu Phe Ala Glu Ile	
2515 2520 2525	
gca cgc agc gtg gac tac cgg cgt ggc gac cta ccg gtc gtg tcg acg	7632
Ala Arg Ser Val Asp Tyr Arg Arg Gly Asp Leu Pro Val Val Ser Thr	
2530 2535 2540	
ttg acg ggt gag ctc gac acc gca ggt gtg atg gct acg ccg gag tat	7680
Leu Thr Gly Glu Leu Asp Thr Ala Gly Val Met Ala Thr Pro Glu Tyr	
2545 2550 2555 2560	
tgg gtg cgt cag gtt cga gag ccc gtc cgc ttc gcc gac ggc gtc cgg	7728

Trp Val Arg Gln Val Arg Glu Pro Val Arg Phe Ala Asp Gly Val Arg	
2565 2570 2575	
gtg ctc gcg cag caa ggg gtc gcc acg atc ttc gaa ctc ggc cct gat	7776
Val Leu Ala Gln Gln Gly Val Ala Thr Ile Phe Glu Leu Gly Pro Asp	
2580 2585 2590	
gcg acg ctg tcg gcc ctg att ccc gat tgt cat tcg tgg gct gat cag	7824
Ala Thr Leu Ser Ala Leu Ile Pro Asp Cys His Ser Trp Ala Asp Gln	
2595 2600 2605	
gcc atg ccg att ccg atg ctg cgt aaa gac cgt acg gaa acc gaa act	7872
Ala Met Pro Ile Pro Met Leu Arg Lys Asp Arg Thr Glu Thr Glu Thr	
2610 2615 2620	
gtg gtc gcc gcg gtg gcg cgg gcg cac acg cgt ggt gtt ccg gtc gaa	7920
Val Val Ala Ala Val Ala Arg Ala His Thr Arg Gly Val Pro Val Glu	
2625 2630 2635 2640	
tgg tcg gcg tat ttc gcc ggc acc ggg gca cgg cgg gtc gag ttg ccg	7968
Trp Ser Ala Tyr Phe Ala Gly Thr Gly Ala Arg Arg Val Glu Leu Pro	
2645 2650 2655	
acg tat gcc ttc cag cgg cag cgg tac tgg ctg gaa aca tcg gat tac	8016
Thr Tyr Ala Phe Gln Arg Gln Arg Tyr Trp Leu Glu Thr Ser Asp Tyr	
2660 2665 2670	
ggc gat gtg acg ggt atc ggc ctg gct gcg gcg gag cat ccg ttg ctg	8064
Gly Asp Val Thr Gly Ile Gly Leu Ala Ala Ala Glu His Pro Leu Leu	
2675 2680 2685	
ggg gcc gtg gtt gcg ctg gcc gat ggt gat ggg atg gtg ctg acc ggc	8112
Gly Ala Val Val Ala Leu Ala Asp Gly Asp Gly Met Val Leu Thr Gly	
2690 2695 2700	
cgg ttg tcg gtg ggg acg cat ccg tgg ctg gcc cag cat cgc gtg ctg	8160
Arg Leu Ser Val Gly Thr His Pro Trp Leu Ala Gln His Arg Val Leu	
2705 2710 2715 2720	
ggc gag gtc gtc gtc ccc ggc acc gcc atc ctg gag atg gcc ctg cac	8208
Gly Glu Val Val Val Pro Gly Thr Ala Ile Leu Glu Met Ala Leu His	
2725 2730 2735	
gca ggg gcg cgt ctc ggc tgt gac cgg gtg gaa gag ctc acc ctg gaa	8256
Ala Gly Ala Arg Leu Gly Cys Asp Arg Val Glu Glu Leu Thr Leu Glu	
2740 2745 2750	
aca ccg ctg gtg gtc ccc gaa cgc gcg gcg ggt gcc ggt agt cgt ggc	8304
Thr Pro Leu Val Val Pro Glu Arg Ala Ala Gly Ala Gly Ser Arg Gly	
2755 2760 2765	
cct gcg gga ggg acc aca gtt tca att gaa act gcg gaa gaa cgt gtg	8352
Pro Ala Gly Gly Thr Thr Val Ser Ile Glu Thr Ala Glu Glu Arg Val	
2770 2775 2780	
cgg acg aac gac gcc atc gaa atc cag ctg ctg gtg aac gca ccc gac	8400
Arg Thr Asn Asp Ala Ile Glu Ile Gln Leu Leu Val Asn Ala Pro Asp	

2785	2790	2795	2800	
gaa ggc ggt cgg cga agg gtg tcg ctg tat tcc cgc ccg gcc ggt ggg				8448
Glu Gly Gly Arg Arg Val Ser Leu Tyr Ser Arg Pro Ala Gly Gly	2805	2810	2815	
tcg aga ggt ggg ggt tgg acg cgc cac gcc acc ggc gaa ctc gtc gtc				8496
Ser Arg Gly Gly Gly Trp Thr Arg His Ala Thr Gly Glu Leu Val Val	2820	2825	2830	
ggc acc acc ggt ggt agg gcg gtt cct gat tgg tcg gct gag ggt gcc				8544
Gly Thr Thr Gly Gly Arg Ala Val Pro Asp Trp Ser Ala Glu Gly Ala	2835	2840	2845	
gag tcg att gct ctc gat gag ttc tac gtc gct ctg gcc gga aac ggg				8592
Glu Ser Ile Ala Leu Asp Glu Phe Tyr Val Ala Leu Ala Gly Asn Gly	2850	2855	2860	
ttc gag tac ggg ccg ttg ttc cag ggg ctt cag gcg gca tgg cgt cgt				8640
Phe Glu Tyr Gly Pro Leu Phe Gln Gly Leu Gln Ala Ala Trp Arg Arg	2865	2870	2875	2880
ggc gac gag gtt ctc gcc gaa atc gcc ccg ccg gcc gag gcc gat gcg				8688
Gly Asp Glu Val Leu Ala Glu Ile Ala Pro Pro Ala Glu Ala Asp Ala	2885	2890	2895	
atg gcg tcg gga tac ctg ctc gac cca gcg ttg ctg gat gcc gcg ctg				8736
Met Ala Ser Gly Tyr Leu Leu Asp Pro Ala Leu Leu Asp Ala Ala Leu	2900	2905	2910	
cag gcg tcc gcg ctc ggc gac cgc ccg gag caa ggc ggc gcg tgg ctg				8784
Gln Ala Ser Ala Leu Gly Asp Arg Pro Glu Gln Gly Gly Ala Trp Leu	2915	2920	2925	
ccg ttc tca ttc acc ggc gtc gaa ctt tcc gct ccg gca ggg acg atc				8832
Pro Phe Ser Phe Thr Gly Val Glu Leu Ser Ala Pro Ala Gly Thr Ile	2930	2935	2940	
agc agg gtg cgg ctg gag acc agg cga ccc gac gcg ata tcg gtg gcc				8880
Ser Arg Val Arg Leu Glu Thr Arg Arg Pro Asp Ala Ile Ser Val Ala	2945	2950	2955	2960
gtg atg gat gag agt ggg cgg ttg ctc gcc tcg atc gat tct ctc agg				8928
Val Met Asp Glu Ser Gly Arg Leu Leu Ala Ser Ile Asp Ser Leu Arg	2965	2970	2975	
cta cga agc gtg tcg tcg gga cag ctg gcg aat cgg gac gct gtc cgc				8976
Leu Arg Ser Val Ser Ser Gly Gln Leu Ala Asn Arg Asp Ala Val Arg	2980	2985	2990	
gac gcg ctg ttc gag gtg acc tgg gag ccg gtg gcg acg cag tcg acg				9024
Asp Ala Leu Phe Glu Val Thr Trp Glu Pro Val Ala Thr Gln Ser Thr	2995	3000	3005	
gaa ccg ggt cgc tgg gcc ctg ctt ggt gat act gcc tgc ggt aaa gac				9072
Glu Pro Gly Arg Trp Ala Leu Gly Asp Thr Ala Cys Gly Lys Asp	3010	3015	3020	

gat ctc atc aaa ctc gca acg gat tcc gcc gac cgc tgc gcg gat ctg	9120
Asp Leu Ile Lys Leu Ala Thr Asp Ser Ala Asp Arg Cys Ala Asp Leu	
3025 3030 3035 3040	
gcg gcg cta gcc gag aaa ctt gat tcc agc gcg ctg gtt cct gat gtc	9168
Ala Ala Leu Ala Glu Lys Leu Asp Ser Ser Ala Leu Val Pro Asp Val	
3045 3050 3055	
gtg gtc tac tgc gcc gga gaa cag gcg gat ccc ggc acc ggc gca gcc	9216
Val Val Tyr Cys Ala Gly Glu Gln Ala Asp Pro Gly Thr Gly Ala Ala	
3060 3065 3070	
gca ctt gcg gag acc cag cag acg ttg gct ctg ctc caa gcg tgg ttg	9264
Ala Leu Ala Glu Thr Gln Gln Thr Leu Ala Leu Leu Gln Ala Trp Leu	
3075 3080 3085	
gct gag ccg cgg ttg gcc gag gca cgt ctg gtg gtg gtg acg tgt gca	9312
Ala Glu Pro Arg Leu Ala Glu Ala Arg Leu Val Val Val Thr Cys Ala	
3090 3095 3100	
gcg gtg acg acg gct ccg agt gac ggt gca tca gag ctg gca cat gcg	9360
Ala Val Thr Thr Ala Pro Ser Asp Gly Ala Ser Glu Leu Ala His Ala	
3105 3110 3115 3120	
ccg ttg tgg ggg ttg ttg cgt gcc gcg cag gtg gag aac ccg ggg cag	9408
Pro Leu Trp Gly Leu Leu Arg Ala Ala Gln Val Glu Asn Pro Gly Gln	
3125 3130 3135	
ttt gtg ctg gcg gac gtc gac gga acc gcc gaa tcg tgg cgt gcg ttg	9456
Phe Val Leu Ala Asp Val Asp Gly Thr Ala Glu Ser Trp Arg Ala Leu	
3140 3145 3150	
ccg agt gcg ttg ggc tcg atg gaa ccg cag ttg gcc ctg ccg aag ggc	9504
Pro Ser Ala Leu Gly Ser Met Glu Pro Gln Leu Ala Leu Arg Lys Gly	
3155 3160 3165	
gcg gtg cga gcg ccc cgc ttg gct tcg gtc gcc ggg cag atc gac gtg	9552
Ala Val Arg Ala Pro Arg Leu Ala Ser Val Ala Gly Gln Ile Asp Val	
3170 3175 3180	
ccc gcg gtt gtg gcg gat ccc gac cga acc gtg ctg att tcg ggc ggc	9600
Pro Ala Val Val Ala Asp Pro Asp Arg Thr Val Leu Ile Ser Gly Gly	
3185 3190 3195 3200	
acg ggc ctg ttg ggg ggc gcg gtt gcc cgc cac ctg gtg acc gaa cgc	9648
Thr Gly Leu Leu Gly Gly Ala Val Ala Arg His Leu Val Thr Glu Arg	
3205 3210 3215	
ggt gtc cgc cga ttg gtg ttg acg ggc cgt cgt ggc tgg gat gct cct	9696
Gly Val Arg Arg Leu Val Leu Thr Gly Arg Arg Gly Trp Asp Ala Pro	
3220 3225 3230	
gga atc acc gag ttg gtg ggt gag ctg aac ggc ctc ggt gcc gtg gtc	9744
Gly Ile Thr Glu Leu Val Gly Glu Leu Asn Gly Leu Gly Ala Val Val	
3235 3240 3245	

gac gtg gtg gcg tgc gac gtc gcg gat cgt gct gat ctg gag tgc ttg	9792
Asp Val Val Ala Cys Asp Val Ala Asp Arg Ala Asp Leu Glu Ser Leu	
3250 3255 3260	
ctg gcg gcg gtc ccg gcg gaa ttt ccg ttg tgc ggc gtg gtg cat gcc	9840
Leu Ala Ala Val Pro Ala Glu Phe Pro Leu Cys Gly Val Val His Ala	
3265 3270 3275 3280	
gcg ggg gcg ctg gcc gac ggg gtg atc gag tgc ttg tca ccg gac gac	9888
Ala Gly Ala Leu Ala Asp Gly Val Ile Glu Ser Leu Ser Pro Asp Asp	
3285 3290 3295	
gtg gga gcg gtg ttc ggc ccg aag gcg gcg ggg gcg tgg aat ctg cac	9936
Val Gly Ala Val Phe Gly Pro Lys Ala Ala Gly Ala Trp Asn Leu His	
3300 3305 3310	
gag ctg act cgt gat acg gac ctg tgc ttc ttc gcg ttg ttc tcc tgc	9984
Glu Leu Thr Arg Asp Thr Asp Leu Ser Phe Phe Ala Leu Phe Ser Ser	
3315 3320 3325	
ctt tcc ggt gtt gcc ggc gct cct ggt cag ggc aat tat gcg gcg gcg	10032
Leu Ser Gly Val Ala Gly Ala Pro Gly Gln Gly Asn Tyr Ala Ala Ala	
3330 3335 3340	
aac gcg ttc ctg gac gca ttg gcg cat tac cgg cgg tca cag gga ctg	10080
Asn Ala Phe Leu Asp Ala Leu Ala His Tyr Arg Arg Ser Gln Gly Leu	
3345 3350 3355 3360	
cct gcg gtg tgc ctg gcc tgg ggc ctg tgg gag cag ccg agc ggg atg	10128
Pro Ala Val Ser Leu Ala Trp Gly Leu Trp Glu Gln Pro Ser Gly Met	
3365 3370 3375	
acg gag acg ctc agc gag gtc gac cgg agc agg atc gcg cgc gcc aac	10176
Thr Glu Thr Leu Ser Glu Val Asp Arg Ser Arg Ile Ala Arg Ala Asn	
3380 3385 3390	
ccg ccg ttg tcc acc aag gag gga ttg cgg ctg ttc gat gcc ggg ctg	10224
Pro Pro Leu Ser Thr Lys Glu Gly Leu Arg Leu Phe Asp Ala Gly Leu	
3395 3400 3405	
gcg ctg gac cgg gca gcg gta gtt ccg gcg aag ttg gac agg act ttc	10272
Ala Leu Asp Arg Ala Ala Val Val Pro Ala Lys Leu Asp Arg Thr Phe	
3410 3415 3420	
ctg gcc gag cag gcg cgg tgc ggc tgc ctg ccc gca ttg ttg acg gca	10320
Leu Ala Glu Gln Ala Arg Ser Gly Ser Leu Pro Ala Leu Leu Thr Ala	
3425 3430 3435 3440	
ctg gta ccc ccc atc cgt cgt aat agg cgg gct agc gga acc gag ctc	10368
Leu Val Pro Pro Ile Arg Arg Asn Arg Arg Ala Ser Gly Thr Glu Leu	
3445 3450 3455	
gcg gac gag ggc acc ctg ctc ggg gtg gtg cgg gag cat gcc gcg gcc	10416
Ala Asp Glu Gly Thr Leu Leu Gly Val Val Arg Glu His Ala Ala Ala	
3460 3465 3470	
gtg ctg ggg tat tgc agc gcg gct gac gtc ggg gtc gag cgc gct ttc	10464

Val Leu Gly Tyr Ser Ser Ala Ala Asp Val Gly Val Glu Arg Ala Phe	
3475 3480 3485	
cgg gat ctg ggt ttt gat tcg ttg tct ggt gtg gag ttg cgg aac cgc	10512
Arg Asp Leu Gly Phe Asp Ser Leu Ser Gly Val Glu Leu Arg Asn Arg	
3490 3495 3500	
ctt gcc ggg gtg ctg ggg gtg cgg ttg ccg gcg act gcg gtg ttc gac	10560
Leu Ala Gly Val Leu Gly Val Arg Leu Pro Ala Thr Ala Val Phe Asp	
3505 3510 3515 3520	
tat ccg acg ccg agg gcg ctg gcc cgg ttc ctg cac cag gaa ctg gca	10608
Tyr Pro Thr Pro Arg Ala Leu Ala Arg Phe Leu His Gln Glu Leu Ala	
3525 3530 3535	
gac gag atc gct acg acg cca gcg ccg gtg acg acg acc agg gca ccg	10656
Asp Glu Ile Ala Thr Thr Pro Ala Pro Val Thr Thr Thr Arg Ala Pro	
3540 3545 3550	
gtc gcc gaa gac gat ctc gtc gcg ata gtc ggg atg gga tgc cgt ttt	10704
Val Ala Glu Asp Asp Leu Val Ala Ile Val Gly Met Gly Cys Arg Phe	
3555 3560 3565	
ccc ggt cag gtg tcc tcg ccg gag gag ctc tgg cgt ttg gtg gcc ggg	10752
Pro Gly Gln Val Ser Ser Pro Glu Glu Leu Trp Arg Leu Val Ala Gly	
3570 3575 3580	
ggc gtg gat gcg gtc gcg gac ttc cca gcc gat cgc ggc tgg gat ctg	10800
Gly Val Asp Ala Val Ala Asp Phe Pro Ala Asp Arg Gly Trp Asp Leu	
3585 3590 3595 3600	
gca ggc ttg ttc gat ccg gac ccg gaa cgg gct ggg aag acc tac gtg	10848
Ala Gly Leu Phe Asp Pro Asp Pro Glu Arg Ala Gly Lys Thr Tyr Val	
3605 3610 3615	
cgg gaa ggg gcc ttc ctc acc gac gcc gat cgg ttc gat gcg ggt ttc	10896
Arg Glu Gly Ala Phe Leu Thr Asp Ala Asp Arg Phe Asp Ala Gly Phe	
3620 3625 3630	
ttc ggg att tcc ccg cgt gag gcg ttg gcg atg gat ccg cag caa cgg	10944
Phe Gly Ile Ser Pro Arg Glu Ala Leu Ala Met Asp Pro Gln Gln Arg	
3635 3640 3645	
ctg ttg ctg gag ctg tcc tgg gag gcc att gaa cgg gca ggg atc gat	10992
Leu Leu Leu Glu Leu Ser Trp Glu Ala Ile Glu Arg Ala Gly Ile Asp	
3650 3655 3660	
ccg ggt tcg ctg agg ggg agt cgg acc ggt gtg ttc gcg ggg ctg atg	11040
Pro Gly Ser Leu Arg Gly Ser Arg Thr Gly Val Phe Ala Gly Leu Met	
3665 3670 3675 3680	
tac cac gac tat ggc gcc cgg ttc gcc agc cga gcc ccg gaa ggt ttc	11088
Tyr His Asp Tyr Gly Ala Arg Phe Ala Ser Arg Ala Pro Glu Gly Phe	
3685 3690 3695	
gag ggg tat ctc ggc aat ggc agt gct ggg agt gtc gcg tcg ggc cgg	11136
Glu Gly Tyr Leu Gly Asn Gly Ser Ala Gly Ser Val Ala Ser Gly Arg	

3700	3705	3710	
att gcg tac tcg ttt ggt ttc gag ggt cct gcg gtg acg gtg gat act			11184
Ile Ala Tyr Ser Phe Gly Phe Glu Gly Pro Ala Val Thr Val Asp Thr			
3715	3720	3725	
gcg tgt tcg tcg tcg ttg gtg gcg ttg cat ttg gcg ggt cag tcg ttg			11232
Ala Cys Ser Ser Ser Leu Val Ala Leu His Leu Ala Gly Gln Ser Leu			
3730	3735	3740	
cgt tcc ggc gaa tgc gat ctc gcc ctt gcc ggt ggt gtg acg gtg atg			11280
Arg Ser Gly Glu Cys Asp Leu Ala Leu Ala Gly Gly Val Thr Val Met			
3745	3750	3755	3760
tcg acg ccc ggg acg ttt gtg gaa ttc tcc cgt cag cgg ggc ctg gca			11328
Ser Thr Pro Gly Thr Phe Val Glu Phe Ser Arg Gln Arg Gly Leu Ala			
3765	3770	3775	
ccg gac ggg cgg tgc aag tcg ttc gcg gag agc gcg gac ggt acc ggt			11376
Pro Asp Gly Arg Cys Lys Ser Phe Ala Glu Ser Ala Asp Gly Thr Gly			
3780	3785	3790	
tgg ggt gag ggt gct ggt ttg gtg ttg ttg gag cgg ttg tcg gat gct			11424
Trp Gly Glu Gly Ala Gly Leu Val Leu Leu Glu Arg Leu Ser Asp Ala			
3795	3800	3805	
cgg cgg aat ggg cat cgg gtg ttg gcg gtg gtt cgt ggg tcg gcg gtg			11472
Arg Arg Asn Gly His Arg Val Leu Ala Val Val Arg Gly Ser Ala Val			
3810	3815	3820	
aat cag gat ggt gcg tcg aat ggc ttg acc gcg ccg aat ggt ccc tcg			11520
Asn Gln Asp Gly Ala Ser Asn Gly Leu Thr Ala Pro Asn Gly Pro Ser			
3825	3830	3835	3840
cag cag cgg gtc atc cag cag gcg ttg gcg agt gcg ggt ctg tcg gtg			11568
Gln Gln Arg Val Ile Gln Gln Ala Leu Ala Ser Ala Gly Leu Ser Val			
3845	3850	3855	
tcc gat gtg gat gcc gtg gag gcg cat ggg acc ggg acc agg ttg ggt			11616
Ser Asp Val Asp Ala Val Glu Ala His Gly Thr Gly Thr Arg Leu Gly			
3860	3865	3870	
gat ccg att gag gcg cag gct ctg att gct acg tat ggg cgc gat cgt			11664
Asp Pro Ile Glu Ala Gln Ala Leu Ile Ala Thr Tyr Gly Arg Asp Arg			
3875	3880	3885	
gat ccc ggt cgg ccg ttg tgg ttg ggg tcg gtg aag tcc aac atc ggt			11712
Asp Pro Gly Arg Pro Leu Trp Leu Gly Ser Val Lys Ser Asn Ile Gly			
3890	3895	3900	
cat acg cag gcg gcg gcg ggt gtt gcc ggt gtg atc aag atg gtg atg			11760
His Thr Gln Ala Ala Ala Gly Val Ala Gly Val Ile Lys Met Val Met			
3905	3910	3915	3920
gcg atg cgg cac ggg caa ctt ccg cgc acg ctg cac gtg gat gca ccc			11808
Ala Met Arg His Gly Gln Leu Pro Arg Thr Leu His Val Asp Ala Pro			
3925	3930	3935	

tcc tcg cag gtg gat tgg tcg gcg ggg agg gtc cag ctc ctg acg gag Ser Ser Gln Val Asp Trp Ser Ala Gly Arg Val Gln Leu Leu Thr Glu 3940 3945 3950	11856
aac acg ccc tgg ccc gac agt ggt cgc ccc tgt cgg gtg ggg gtg tcg Asn Thr Pro Trp Pro Asp Ser Gly Arg Pro Cys Arg Val Gly Val Ser 3955 3960 3965	11904
tcg ttc ggg atc agc ggc acc aac gcg cac gtc atc ctg gaa cag tcc Ser Phe Gly Ile Ser Gly Thr Asn Ala His Val Ile Leu Glu Gln Ser 3970 3975 3980	11952
acg ggg cag atg gat cag gca gcg gag ccg gat tcg agt cct gtt ctg Thr Gly Gln Met Asp Gln Ala Ala Glu Pro Asp Ser Ser Pro Val Leu 3985 3990 3995 4000	12000
gat gtt ccg gtg gtg ccg tgg gtg gtg tcg ggc aaa aca ccc gaa gcg Asp Val Pro Val Val Pro Trp Val Val Ser Gly Lys Thr Pro Glu Ala 4005 4010 4015	12048
cta tcc gcc cag gcg gca acg ttg gcg acc tat ttg gac caa aat gtt Leu Ser Ala Gln Ala Ala Thr Leu Ala Thr Tyr Leu Asp Gln Asn Val 4020 4025 4030	12096
gat gtc tcc cct ctg gac gtt ggg att tcg ctt gcg gtg acc cgt tcg Asp Val Ser Pro Leu Asp Val Gly Ile Ser Leu Ala Val Thr Arg Ser 4035 4040 4045	12144
gcg ctg gat gag cgg gcg gtg gtg ctg ggg tcg gat cgt gac acg ttg Ala Leu Asp Glu Arg Ala Val Val Leu Gly Ser Asp Arg Asp Thr Leu 4050 4055 4060	12192
ttg tct ggc ctg aat gcg ctg gct gcc ggt cat gag gct gct ggc gtg Leu Ser Gly Leu Asn Ala Leu Ala Ala Gly His Glu Ala Ala Gly Val 4065 4070 4075 4080	12240
gtt acg gga cct gtc ggg att ggt ggc cgg acc ggg ttt gtg ttc gcc Val Thr Gly Pro Val Gly Ile Gly Gly Arg Thr Gly Phe Val Phe Ala 4085 4090 4095	12288
ggt caa ggc ggt cag tgg ttg ggg atg ggc cgc cgg ttg tac tcg gag Gly Gln Gly Gly Gln Trp Leu Gly Met Gly Arg Arg Leu Tyr Ser Glu 4100 4105 4110	12336
ttt ccg gcg ttc gcc ggt gct ttc gac gaa gca tgc gcc gag ctc gat Phe Pro Ala Phe Ala Gly Ala Phe Asp Glu Ala Cys Ala Glu Leu Asp 4115 4120 4125	12384
gcg aac ctg ggg agg gaa gtc ggg gtt cgg gat gtg gtg ttc ggc tcc Ala Asn Leu Gly Arg Glu Val Gly Val Arg Asp Val Val Phe Gly Ser 4130 4135 4140	12432
gac gag tcc ttg ctg gat cgg act ttg tgg gcg cag tcg ggt ttg ttc Asp Glu Ser Leu Leu Asp Arg Thr Leu Trp Ala Gln Ser Gly Leu Phe 4145 4150 4155 4160	12480

gcg ttg cag gtc ggt ctc tgg gaa ttg ttg ggt acg tgg ggt gtt cgg	12528
Ala Leu Gln Val Gly Leu Trp Glu Leu Leu Gly Thr Trp Gly Val Arg	
4165 4170 4175	
ccc agc gta gtg ctg ggg cat tcg gtc ggg gag cta gcc gcg gcg ttc	12576
Pro Ser Val Val Leu Gly His Ser Val Gly Glu Leu Ala Ala Ala Phe	
4180 4185 4190	
gcc gca ggt gtg ctg tcg atg gcg gag gcg gct cgg ctg gtg gcg ggt	12624
Ala Ala Gly Val Leu Ser Met Ala Glu Ala Ala Arg Leu Val Ala Gly	
4195 4200 4205	
cgt gcg cgg ttg atg cag gcg ttg cct tct ggc ggt gcc atg ctg gcg	12672
Arg Ala Arg Leu Met Gln Ala Leu Pro Ser Gly Gly Ala Met Leu Ala	
4210 4215 4220	
gtg tcc gcg acc gag gcc cga gtc ggc ccg ctg ctc gat ggg gtg cgg	12720
Val Ser Ala Thr Glu Ala Arg Val Gly Pro Leu Leu Asp Gly Val Arg	
4225 4230 4235 4240	
gat cgt gtt ggt gtc gca gcg gtt aac gct ccg ggg tcg gtg gtg ctt	12768
Asp Arg Val Gly Val Ala Ala Val Asn Ala Pro Gly Ser Val Val Leu	
4245 4250 4255	
tcc ggt gac cgg gat gtg ctc gat ggc att gcc ggt cgg ctg gac ggg	12816
Ser Gly Asp Arg Asp Val Leu Asp Gly Ile Ala Gly Arg Leu Asp Gly	
4260 4265 4270	
caa ggt atc cgg tcg agg tgg ttg cgg gtt tcg cac gcg ttt cat tcg	12864
Gln Gly Ile Arg Ser Arg Trp Leu Arg Val Ser His Ala Phe His Ser	
4275 4280 4285	
cat cgg atg gat ccg atg ctg gcg gag ttc gcc gag ctc gca cgg agc	12912
His Arg Met Asp Pro Met Leu Ala Glu Phe Ala Glu Leu Ala Arg Ser	
4290 4295 4300	
gtg gac tac cgg tct cca cgg ctg ccg att gtc tcg acg ctg acc gga	12960
Val Asp Tyr Arg Ser Pro Arg Leu Pro Ile Val Ser Thr Leu Thr Gly	
4305 4310 4315 4320	
aac ctc gat gac gtg ggc gtg atg gct acg ccg gag tat tgg gtg cgc	13008
Asn Leu Asp Asp Val Gly Val Met Ala Thr Pro Glu Tyr Trp Val Arg	
4325 4330 4335	
cag gtg cga gag ccc gtc cgc ttc gcc gac ggt gtc cag gcg ctt gtg	13056
Gln Val Arg Glu Pro Val Arg Phe Ala Asp Gly Val Gln Ala Leu Val	
4340 4345 4350	
gac caa ggc gtc gac acg att gtg gaa ctc ggt ccg gac ggg gcg ttg	13104
Asp Gln Gly Val Asp Thr Ile Val Glu Leu Gly Pro Asp Gly Ala Leu	
4355 4360 4365	
tcg agc ttg gtt caa gag tgt gtg gcg gag tcc ggg cgg gcg acg ggg	13152
Ser Ser Leu Val Gln Glu Cys Val Ala Glu Ser Gly Arg Ala Thr Gly	
4370 4375 4380	
att ccg ttg gtg cgg aga gac cgt gat gag gtc cga acg gtg ctg gac	13200

Ile	Pro	Leu	Val	Arg	Arg	Asp	Arg	Asp	Glu	Val	Arg	Thr	Val	Leu	Asp	
4385						4390				4395					4400	
gct	ttg	gcg	cag	acc	cac	act	cgt	ggc	ggc	gcg	gtg	gac	tgg	ggg	tca	13248
Ala	Leu	Ala	Gln	Thr	His	Thr	Arg	Gly	Gly	Ala	Val	Asp	Trp	Gly	Ser	
				4405					4410					4415		
ttt	ttc	gct	ggc	acg	agg	gca	acg	caa	gtc	gac	ctt	ccc	acg	tat	gcc	13296
Phe	Phe	Ala	Gly	Thr	Arg	Ala	Thr	Gln	Val	Asp	Leu	Pro	Thr	Tyr	Ala	
			4420					4425				4430				
ttc	caa	cga	cag	cgg	tac	tgg	ctg	gag	cca	tcg	gat	tcc	ggc	gat	gtg	13344
Phe	Gln	Arg	Gln	Arg	Tyr	Trp	Leu	Glu	Pro	Ser	Asp	Ser	Gly	Asp	Val	
		4435					4440					4445				
acc	ggt	gtt	ggc	ctg	acc	ggg	gcg	gag	cat	ccg	ctg	ttg	ggc	gcc	gtg	13392
Thr	Gly	Val	Gly	Leu	Thr	Gly	Ala	Glu	His	Pro	Leu	Leu	Gly	Ala	Val	
	4450					4455					4460					
gtg	ccg	gtc	gcg	ggc	ggc	gat	gag	gtg	ctg	ctg	acc	ggc	agg	ctg	tcg	13440
Val	Pro	Val	Ala	Gly	Gly	Asp	Glu	Val	Leu	Leu	Thr	Gly	Arg	Leu	Ser	
4465					4470				4475						4480	
gtg	ggg	acg	cat	ccg	tgg	ctg	gcg	gaa	cac	cgc	gtg	ctg	ggc	gaa	gtc	13488
Val	Gly	Thr	His		Pro	Trp	Leu	Ala	Glu	His	Arg	Val	Leu	Gly	Glu	
				4485				4490						4495		
gtc	gtc	ccc	ggc	acc	gcg	ttg	ctg	gag	atg	gcg	tgg	cgg	gcc	ggc	agc	13536
Val	Val	Pro	Gly	Thr	Ala	Leu	Leu	Glu	Met	Ala	Trp	Arg	Ala	Gly	Ser	
			4500					4505					4510			
cag	gtc	ggc	tgt	gaa	cgt	gtg	gag	gag	ctc	acc	ttg	gag	gca	ccg	ctg	13584
Gln	Val	Gly	Cys	Glu	Arg	Val	Glu	Glu	Leu	Thr	Leu	Glu	Ala	Pro	Leu	
		4515					4520					4525				
gtc	ctg	ccg	gag	cgg	ggc	gct	gcg	gcg	gtg	cag	ttg	gcg	gtg	ggg	gct	13632
Val	Leu	Pro	Glu	Arg	Gly	Ala	Ala	Ala	Val	Gln	Leu	Ala	Val	Gly	Ala	
	4530					4535				4540						
ccg	gat	gag	gcc	ggc	cgg	cgc	agt	ttg	cag	ctc	tat	tcc	cga	ggc	gct	13680
Pro	Asp	Glu	Ala	Gly	Arg	Arg	Ser	Leu	Gln	Leu	Tyr	Ser	Arg	Gly	Ala	
4545					4550				4555						4560	
gat	gaa	gac	ggc	gac	tgg	cgg	cgg	att	gcc	tcc	ggg	ctg	ttg	gcc	cag	13728
Asp	Glu	Asp	Gly	Asp	Trp	Arg	Arg	Ile	Ala	Ser	Gly	Leu	Leu	Ala	Gln	
				4565				4570						4575		
gcc	aat	gcg	gtg	ccg	ccg	gcg	gat	tcg	acg	gca	tgg	ccg	ccg	gac	ggc	13776
Ala	Asn	Ala	Val	Pro	Pro	Ala	Asp	Ser	Thr	Ala	Trp	Pro	Pro	Asp	Gly	
			4													

4610	4615	4620	
cac ggc gac gat atc ttc gcc gaa ttg gcc ggg tca cca gac gcc tcg			13920
His Gly Asp Asp Ile Phe Ala Glu Leu Ala Gly Ser Pro Asp Ala Ser			
4625	4630	4635	4640
ggc ttc ggc atc cac ccg gcg ctg ctg gac gct gca ctg cac gcg atg			13968
Gly Phe Gly Ile His Pro Ala Leu Leu Asp Ala Ala Leu His Ala Met			
4645	4650	4655	
gcg ctt ggt gct tcg ccc gac tcg gaa gcg cgt ctg ccg ttt tcc tgg			14016
Ala Leu Gly Ala Ser Pro Asp Ser Glu Ala Arg Leu Pro Phe Ser Trp			
4660	4665	4670	
cgt ggc gcc cag ctg tac cgc gct gaa gga gca gcg ctt cgg gta cgg			14064
Arg Gly Ala Gln Leu Tyr Arg Ala Glu Gly Ala Ala Leu Arg Val Arg			
4675	4680	4685	
ctc tcg ccg ctg ggc tcc ggt gca gtc tca ttg acg ttg gtg gat gcc			14112
Leu Ser Pro Leu Gly Ser Gly Ala Val Ser Leu Thr Leu Val Asp Ala			
4690	4695	4700	
aca ggg cga cga gtc gct gcg gtg gaa tcg ctt tcg acg cga ccg gtc			14160
Thr Gly Arg Arg Val Ala Ala Val Glu Ser Leu Ser Thr Arg Pro Val			
4705	4710	4715	4720
tcc acc gac cag atc ggt gcc ggt cgc ggc gat caa gag cgg ctg ctg			14208
Ser Thr Asp Gln Ile Gly Ala Gly Arg Gly Asp Gln Glu Arg Leu Leu			
4725	4730	4735	
cac gtc gag tgg gta agg tcg gct gaa tct gcg ggg atg tct ctg acc			14256
His Val Glu Trp Val Arg Ser Ala Glu Ser Ala Gly Met Ser Leu Thr			
4740	4745	4750	
tcc tgc gcg gtg gtc ggt ttg ggc gaa ccg gag tgg cac gct gcg ctg			14304
Ser Cys Ala Val Val Gly Leu Gly Glu Pro Glu Trp His Ala Ala Leu			
4755	4760	4765	
aag acc act ggt gtc caa gtc gag tcc cat gcg gac ctt gct tcg ttg			14352
Lys Thr Thr Gly Val Gln Val Glu Ser His Ala Asp Leu Ala Ser Leu			
4770	4775	4780	
gcc acc gag gtt gcc aag ccg ggt tca gct cct ggt gcg gtc atc gtc			14400
Ala Thr Glu Val Ala Lys Arg Gly Ser Ala Pro Gly Ala Val Ile Val			
4785	4790	4795	4800
ccg tgc ccg cga ccc cga gcg atg cag gag ctg ccg acc gcc gcg cga			14448
Pro Cys Pro Arg Pro Arg Ala Met Gln Glu Leu Pro Thr Ala Ala Arg			
4805	4810	4815	
agg gcg acg caa cag gcg atg gcg atg ctg cag caa tgg ctt gcc gat			14496
Arg Ala Thr Gln Gln Ala Met Ala Met Leu Gln Gln Trp Leu Ala Asp			
4820	4825	4830	
gac ccg ttc gtc agt acg cgc ctg atc ctg ctg acg cat ccg gcg gtc			14544
Asp Arg Phe Val Ser Thr Arg Leu Ile Leu Leu Thr His Arg Ala Val			
4835	4840	4845	

tcc gca gtt gct gga gaa gac gtg ctc gac ctg gta cac gcg ccg ctg Ser Ala Val Ala Gly Glu Asp Val Leu Asp Leu Val His Ala Pro Leu 4850 4855 4860	14592
tgg ggc ttg gtc cgc agc gcg caa gcg gag cac ccg gac cga ttc gcc Trp Gly Leu Val Arg Ser Ala Gln Ala Glu His Pro Asp Arg Phe Ala 4865 4870 4875 4880	14640
ttg atc gat atg gac gac gag cga gca tcg cag acg gca ctc gcc gaa Leu Ile Asp Met Asp Asp Glu Arg Ala Ser Gln Thr Ala Leu Ala Glu 4885 4890 4895	14688
gcg ctg act gcg gga gaa gcg cag ctc gcg gtg cgg tcg gga gtt gtg Ala Leu Thr Ala Gly Glu Ala Gln Leu Ala Val Arg Ser Gly Val Val 4900 4905 4910	14736
ctg gcg ccc cgc ctc ggc cag gtg aag gtg agt gga ggt gaa gcg ttc Leu Ala Pro Arg Leu Gly Gln Val Lys Val Ser Gly Gly Glu Ala Phe 4915 4920 4925	14784
agg tgg gat gaa ggc acc gtg ctg gtc acc ggc gga acc ggc ggg ctc Arg Trp Asp Glu Gly Thr Val Leu Val Thr Gly Gly Thr Gly Gly Leu 4930 4935 4940	14832
ggg gcc ctg ctc gca cgc cat ctg gtc agc gcc cac ggt gtg cgg cac Gly Ala Leu Leu Ala Arg His Leu Val Ser Ala His Gly Val Arg His 4945 4950 4955 4960	14880
ctg ttg ctc gca agt cgc cgt ggt ctg gcg gcg ccc gga gcg gat gag Leu Leu Leu Ala Ser Arg Arg Gly Leu Ala Ala Pro Gly Ala Asp Glu 4965 4970 4975	14928
ctg gtg gcc gag ctg gag cag gcc ggc gcc gac gtc gcg gtc gtc gcg Leu Val Ala Glu Leu Glu Gln Ala Gly Ala Asp Val Ala Val Val Ala 4980 4985 4990	14976
tgc gac tcg gca gat cgg gac tcg ctt gcg cgg ctg gtg gcg tcg gtg Cys Asp Ser Ala Asp Arg Asp Ser Leu Ala Arg Leu Val Ala Ser Val 4995 5000 5005	15024
cct gcg gaa aac ccg ttg cgg gtg gtg gtg cac gcc gcc ggt gtg ctg Pro Ala Glu Asn Pro Leu Arg Val Val Val His Ala Ala Gly Val Leu 5010 5015 5020	15072
gat gac ggt gtg ctg atg tcg atg tcg ccg gag cgc ttg gac gcg gtg Asp Asp Gly Val Leu Met Ser Met Ser Pro Glu Arg Leu Asp Ala Val 5025 5030 5035 5040	15120
ttg cgg ccc aaa gtg gat gcc gcg tgg tac ctg cac gag ctg act cgg Leu Arg Pro Lys Val Asp Ala Ala Trp Tyr Leu His Glu Leu Thr Arg 5045 5050 5055	15168
gaa ctc ggt ctg tcg gcg ttc gtg ttg ttc tcc tcg gtc gcg ggc ctg Glu Leu Gly Leu Ser Ala Phe Val Leu Phe Ser Ser Val Ala Gly Leu 5060 5065 5070	15216

ttc ggc ggt gcg ggg cag agc aat tac gct gcc ggc aac gct ttc ctg Phe Gly Gly Ala Gly Gln Ser Asn Tyr Ala Ala Gly Asn Ala Phe Leu 5075 5080 5085	15264
gat gcc ttg gcg cat tgc cgg cag gcc cag ggg ctg ccc gcg ctg tcg Asp Ala Leu Ala His Cys Arg Gln Ala Gln Gly Leu Pro Ala Leu Ser 5090 5095 5100	15312
ctg gcc tcc ggg ctg tgg gcg agt atc gat gga atg gcg ggc gac ctc Leu Ala Ser Gly Leu Trp Ala Ser Ile Asp Gly Met Ala Gly Asp Leu 5105 5110 5115 5120	15360
gct gcg gca gat gtg gag cgg ctg tcg cgg gca ggc att ggc ccg ctt Ala Ala Ala Asp Val Glu Arg Leu Ser Arg Ala Gly Ile Gly Pro Leu 5125 5130 5135	15408
tcg gca ccg gga ggg ctg gcc ttg ttc gac gct gcc gtt ggc tcg gac Ser Ala Pro Gly Gly Leu Ala Leu Phe Asp Ala Ala Val Gly Ser Asp 5140 5145 5150	15456
gaa ccg ttg ctg gca ccg gtg cga ctg gat gtc gaa gca ctg cgt gtg Glu Pro Leu Leu Ala Pro Val Arg Leu Asp Val Glu Ala Leu Arg Val 5155 5160 5165	15504
cag gcc cga tcc gtg cag acc cgg att ccg gaa atg ctg cat ggc atg Gln Ala Arg Ser Val Gln Thr Arg Ile Pro Glu Met Leu His Gly Met 5170 5175 5180	15552
gca atg ggg cca agc cgc cgc act ccg ttc act tcc agg gtt gag ccg Ala Met Gly Pro Ser Arg Arg Thr Pro Phe Thr Ser Arg Val Glu Pro 5185 5190 5195 5200	15600
ttg cac gaa cgg ctg gcc gga ttg tcg gag ggc gaa cgt cgg cag caa Leu His Glu Arg Leu Ala Gly Leu Ser Glu Gly Glu Arg Arg Gln Gln 5205 5210 5215	15648
gtg ctc cag cgc gtc cgc gcc gat atc gcg gtg gta ctg ggg cac ggc Val Leu Gln Arg Val Arg Ala Asp Ile Ala Val Val Leu Gly His Gly 5220 5225 5230	15696
agg tcg agc gat gtg gac atc gag aag cct ttg gcc gag ctg ggt ttc Arg Ser Ser Asp Val Asp Ile Glu Lys Pro Leu Ala Glu Leu Gly Phe 5235 5240 5245	15744
gac tcg ctg acg gcc atc gaa ctc cgc aac cgt ctc gct acc gcc acc Asp Ser Leu Thr Ala Ile Glu Leu Arg Asn Arg Leu Ala Thr Ala Thr 5250 5255 5260	15792
gga ctg cgg ctt ccc gcg acg ctg gcc ttc gac cac ggc act gcg gcg Gly Leu Arg Leu Pro Ala Thr Leu Ala Phe Asp His Gly Thr Ala Ala 5265 5270 5275 5280	15840
gca ctc gcc cag cac gtg tgc gcg cag cta ggc acc gcg acc gcg ccg Ala Leu Ala Gln His Val Cys Ala Gln Leu Gly Thr Ala Thr Ala Pro 5285 5290 5295	15888
gca ccg agg cga acc gac gac aac gac gcc acg gag ccc gtg agg tcg	15936

Ala Pro Arg Arg Thr Asp Asp Asn Asp Ala Thr Glu Pro Val Arg Ser	
5300 5305 5310	
ctc ttc caa cag gcg tat gcg gct ggc cgg ata ctt gac ggg atg gat	15984
Leu Phe Gln Gln Ala Tyr Ala Ala Gly Arg Ile Leu Asp Gly Met Asp	
5315 5320 5325	
ttg gtg aag gtc gct gcc cag ttg cga ccg gtg ttc ggt tcg cct ggc	16032
Leu Val Lys Val Ala Ala Gln Leu Arg Pro Val Phe Gly Ser Pro Gly	
5330 5335 5340	
gag ctg gaa tcc ctg ccg aaa ccc gtc cag ctt tcc cgt ggt ccc gaa	16080
Glu Leu Glu Ser Leu Pro Lys Pro Val Gln Leu Ser Arg Gly Pro Glu	
5345 5350 5355 5360	
gag ctt gcc ttg gtg tgc atg ccg gcg ctg atc ggg atg ccg ccc gca	16128
Glu Leu Ala Leu Val Cys Met Pro Ala Leu Ile Gly Met Pro Pro Ala	
5365 5370 5375	
cag cag tac gcg cgg atc gcc gcc ggg ttc cgc gat gtg cgg gac gtt	16176
Gln Gln Tyr Ala Arg Ile Ala Ala Gly Phe Arg Asp Val Arg Asp Val	
5380 5385 5390	
tcg gtg atc ccg atg cct gga ttc att gcg gga gaa ccg ctg ccg tcc	16224
Ser Val Ile Pro Met Pro Gly Phe Ile Ala Gly Glu Pro Leu Pro Ser	
5395 5400 5405	
gcc atc gag gtg gcg gtt cgg acg cag gcg gag gcg gtg ctg cag gaa	16272
Ala Ile Glu Val Ala Val Arg Thr Gln Ala Glu Ala Val Leu Gln Glu	
5410 5415 5420	
ttc gcc ggg ggc tcg ttc gta ctg gtc ggg cat tcc tcc ggg ggc tgg	16320
Phe Ala Gly Gly Ser Phe Val Leu Val Gly His Ser Ser Gly Gly Trp	
5425 5430 5435 5440	
ctg gcg cac gag gta gcc ggt gag ctg gag cgt cgc ggg gtc gtc ccg	16368
Leu Ala His Glu Val Ala Gly Glu Leu Glu Arg Arg Gly Val Val Pro	
5445 5450 5455	
gcc ggg gtc gta ctg ctg gac acc tac atc ccc ggt gag atc acg ccg	16416
Ala Gly Val Val Leu Leu Asp Thr Tyr Ile Pro Gly Glu Ile Thr Pro	
5460 5465 5470	
agg ttc tcc gtg gcg atg gcc cac cgg acg tat gag aag ctc gcg act	16464
Arg Phe Ser Val Ala Met Ala His Arg Thr Tyr Glu Lys Leu Ala Thr	
5475 5480 5485	
ttc acg gac atg cag gat gtc ggt atc acc gcg atg ggc ggg tac ttc	16512
Phe Thr Asp Met Gln Asp Val Gly Ile Thr Ala Met Gly Gly Tyr Phe	
5490 5495 5500	
cgg atg ttc acc gag tgg act ccg acg ccg atc ggt gct ccg acg ctg	16560
Arg Met Phe Thr Glu Trp Thr Pro Thr Pro Ile Gly Ala Pro Thr Leu	
5505 5510 5515 5520	
ttc gtg cgg acc gaa gat tgc gtc gca gac cct gaa ggg cgg ccg tgg	16608
Phe Val Arg Thr Glu Asp Cys Val Ala Asp Pro Glu Gly Arg Pro Trp	

5525	5530	5535	
aca gat gac tcc tgg cgg cca ggg tgg act ctc gcg gat gcc acg gtc			16656
Thr Asp Asp Ser Trp Arg Pro Gly Trp Thr Leu Ala Asp Ala Thr Val			
5540	5545	5550	
cag gtg ccg ggc gac cac ttc tcg atg atg gac gag cac gcc ggg tcc			16704
Gln Val Pro Gly Asp His Phe Ser Met Met Asp Glu His Ala Gly Ser			
5555	5560	5565	
acc gca cag gca gtc gcg agt tgg ctt gac aaa ctc aac cag cgc acc			16752
Thr Ala Gln Ala Val Ala Ser Trp Leu Asp Lys Leu Asn Gln Arg Thr			
5570	5575	5580	
gct cgg caa cgc tga			16767
Ala Arg Gln Arg			
5585			
<210> 50			
<211> 5588			
<212> PRT			
<213> Saccharopolyspora spinosa			
<400> 50			
Met Ala Asn Glu Glu Lys Leu Arg Glu Tyr Leu Lys Arg Val Val Val			
1	5	10	15
Glu Leu Glu Glu Ala His Glu Arg Leu His Glu Leu Glu Arg Gln Glu			
20	25	30	
His Asp Pro Ile Ala Ile Val Ser Met Gly Cys Arg Tyr Pro Gly Gly			
35	40	45	
Val Ser Thr Pro Glu Glu Leu Trp Arg Leu Val Val Asp Gly Gly Asp			
50	55	60	
Ala Ile Ala Asn Phe Pro Glu Asp Arg Gly Trp Asn Leu Asp Glu Leu			
65	70	75	80
Phe Asp Pro Asp Pro Gly Arg Ala Gly Thr Ser Tyr Val Arg Glu Gly			
85	90	95	
Gly Phe Leu Arg Gly Val Ala Asp Phe Asp Ala Gly Leu Phe Gly Ile			
100	105	110	
Ser Pro Arg Glu Ala Gln Ala Met Asp Pro Gln Gln Arg Leu Leu Leu			
115	120	125	
Glu Ile Ser Trp Glu Val Phe Glu Arg Ala Gly Ile Asp Pro Phe Ser			
130	135	140	
Leu Arg Gly Thr Lys Thr Gly Val Phe Ala Gly Leu Ile Tyr His Asp			
145	150	155	160
Tyr Ala Ser Arg Phe Arg Lys Thr Pro Ala Glu Phe Glu Gly Tyr Phe			
165	170	175	

Ala Thr Gly Asn Ala Gly Ser Val	Ala Ser Gly Arg Val	Ala Tyr Thr
180	185	190
Phe Gly Leu Glu Gly Pro Ala Val	Thr Val Asp Thr	Ala Cys Ser Ser
195	200	205
Ser Leu Val Ala Leu His Leu Ala Cys Gln Ser	Leu Arg Leu Gly Glu	
210	215	220
Cys Asp Leu Ala Leu Ala Gly Gly Ile Ser Val Met Ala Thr Pro Gly		
225	230	235 240
Ala Phe Val Glu Phe Ser Arg Gln Arg Ala Leu Ala Ser Asp Gly Arg		
	245	250 255
Cys Lys Pro Phe Ala Asp Ala Ala Asp Gly Thr Gly Trp Gly Glu Gly		
	260	265 270
Ala Gly Met Leu Leu Leu Glu Arg Leu Ser Asp Ala Arg Arg Asn Gly		
	275	280 285
His Pro Val Leu Ala Ala Val Val Gly Ser Ala Ile Asn Gln Asp Gly		
	290	295 300
Thr Ser Asn Gly Leu Thr Ala Pro Ser Gly Pro Ala Gln Gln Arg Val		
305	310	315 320
Ile Arg Gln Ala Leu Ala Asn Ala Gly Leu Ser Pro Ala Glu Val Asp		
	325	330 335
Val Val Glu Ala His Gly Thr Gly Thr Ala Leu Gly Asp Pro Ile Glu		
	340	345 350
Ala Gln Ala Leu Ile Ala Thr Tyr Gly Ala Asn Arg Ser Ala Asp His		
	355	360 365
Pro Leu Leu Leu Gly Ser Leu Lys Ser Asn Ile Gly His Thr Gln Ala		
	370	375 380
Ala Ala Gly Val Ala Gly Val Ile Lys Ser Val Leu Ala Ile Arg His		
385	390	395 400
Arg Glu Met Pro Arg Ser Leu His Ile Asp Gln Pro Ser Gln His Val		
	405	410 415
Asp Trp Ser Ala Gly Ala Val Arg Leu Leu Thr Asp Ser Val Asp Trp		
	420	425 430
Pro Asp Leu Gly Arg Pro Arg Arg Ala Gly Val Ser Ser Phe Gly Met		
	435	440 445
Ser Gly Thr Asn Ala His Leu Ile Val Glu Glu Val Ser Asp Glu Pro		
	450	455 460
Val Ser Gly Ser Thr Glu Pro Thr Gly Ala Phe Pro Trp Pro Leu Ser		
465	470	475 480

Gly	Lys	Thr	Glu	Thr	Ala	Leu	Arg	Glu	Gln	Ala	Ala	Glu	Leu	Leu	Ser	485	490	495
Val	Val	Thr	Glu	His	Pro	Glu	Pro	Gly	Leu	Gly	Asp	Val	Gly	Tyr	Ser	500	505	510
Leu	Ala	Thr	Gly	Arg	Ala	Ala	Met	Glu	His	Arg	Ala	Val	Val	Val	Ala	515	520	525
Asp	Asp	Arg	Asp	Ser	Phe	Val	Ala	Gly	Leu	Thr	Ala	Leu	Ala	Ala	Gly	530	535	540
Val	Pro	Ala	Ala	Asn	Val	Val	Gln	Gly	Ala	Ala	Asp	Cys	Lys	Gly	Lys	545	550	555
Val	Ala	Phe	Val	Phe	Pro	Gly	Gln	Gly	Ser	His	Trp	Gln	Gly	Met	Ala	565	570	575
Arg	Glu	Leu	Ser	Glu	Ser	Ser	Pro	Val	Phe	Arg	Arg	Lys	Leu	Ala	Glu	580	585	590
Cys	Ala	Ala	Ala	Thr	Ala	Pro	Tyr	Val	Asp	Trp	Ser	Leu	Leu	Gly	Val	595	600	605
Leu	Arg	Gly	Asp	Pro	Asp	Ala	Pro	Ala	Leu	Asp	Arg	Asp	Asp	Val	Ile	610	615	620
Gln	Leu	Ala	Leu	Phe	Ala	Met	Met	Val	Ser	Leu	Ala	Glu	Leu	Trp	Arg	625	630	635
Ser	Cys	Gly	Val	Glu	Pro	Ala	Ala	Val	Val	Gly	His	Ser	Gln	Gly	Glu	645	650	655
Ile	Ala	Ala	Ala	His	Val	Ala	Gly	Ala	Leu	Ser	Leu	Thr	Asp	Ala	Val	660	665	670
Arg	Ile	Ile	Ala	Ala	Arg	Cys	Asp	Ala	Val	Ser	Ala	Leu	Thr	Gly	Lys	675	680	685
Gly	Gly	Met	Leu	Ala	Ile	Ala	Leu	Pro	Glu	Ser	Ala	Val	Val	Lys	Arg	690	695	700
Ile	Ala	Gly	Leu	Pro	Glu	Leu	Thr	Val	Ala	Ala	Val	Asn	Gly	Pro	Gly	705	710	715
Ser	Thr	Val	Val	Ser	Gly	Glu	Pro	Ser	Ala	Leu	Glu	Arg	Leu	Gln	Thr	725	730	735
Glu	Leu	Thr	Ala	Glu	Asn	Val	Gln	Thr	Arg	Arg	Val	Gly	Ile	Asp	Tyr	740	745	750
Ala	Ser	His	Ser	Pro	Gln	Ile	Ala	Gln	Val	Gln	Gly	Arg	Leu	Leu	Asp	755	760	765
Arg	Leu	Gly	Glu	Val	Gly	Ser	Glu	Pro	Ala	Glu	Ile	Ala	Phe	Tyr	Ser	770	775	780

Thr	Val	Thr	Gly	Glu	Arg	Thr	Asp	Thr	Gly	Arg	Leu	Asp	Ala	Asp	Tyr	785	790	795	800
Trp	Tyr	Gln	Asn	Leu	Arg	Gln	Pro	Val	Arg	Phe	Gln	Gln	Thr	Val	Ala	805	810		815
Arg	Met	Ala	Asp	Gln	Gly	Tyr	Arg	Phe	Phe	Val	Glu	Val	Ser	Pro	His	820	825		830
Pro	Leu	Leu	Thr	Ala	Gly	Ile	Gln	Glu	Thr	Leu	Glu	Ala	Ala	Asp	Ala	835	840		845
Gly	Gly	Val	Val	Val	Gly	Ser	Leu	Arg	Arg	Gly	Glu	Gly	Gly	Ser	Arg	850	855		860
Arg	Trp	Leu	Thr	Ser	Leu	Ala	Glu	Cys	Gln	Val	Arg	Gly	Leu	Pro	Val	865	870	875	880
Asn	Trp	Glu	Gln	Val	Phe	Leu	Asn	Thr	Gly	Ala	Arg	Arg	Val	Pro	Leu	885	890		895
Pro	Thr	Tyr	Pro	Phe	Gln	Arg	Gln	Arg	Tyr	Trp	Leu	Glu	Ser	Ala	Glu	900	905		910
Tyr	Asp	Ala	Gly	Asp	Leu	Gly	Ser	Val	Gly	Leu	Leu	Ser	Ala	Glu	His	915	920		925
Pro	Leu	Leu	Gly	Ala	Ala	Val	Thr	Leu	Ala	Asp	Ala	Gly	Gly	Phe	Leu	930	935		940
Leu	Thr	Gly	Lys	Leu	Ser	Val	Lys	Thr	Gln	Pro	Trp	Leu	Ala	Asp	His	945	950	955	960
Val	Val	Gly	Gly	Ala	Ile	Leu	Leu	Pro	Gly	Thr	Ala	Phe	Val	Glu	Met	965	970		975
Leu	Ile	Arg	Ala	Ala	Asp	Gln	Val	Gly	Cys	Asp	Leu	Ile	Glu	Glu	Leu	980	985		990
Ser	Leu	Thr	Thr	Pro	Leu	Val	Leu	Pro	Ala	Thr	Gly	Ala	Val	Gln	Val	995	1000		1005
Gln	Ile	Ala	Val	Gly	Gly	Pro	Asp	Glu	Ala	Gly	Arg	Arg	Ser	Val	Arg	1010	1015		1020
Val	His	Ser	Cys	Arg	Asp	Asp	Ala	Val	Pro	Gln	Asp	Ser	Trp	Thr	Cys	1025	1030	1035	1040
His	Ala	Thr	Gly	Thr	Leu	Thr	Ser	Ser	Asp	His	Gln	Asp	Ala	Gly	Gln	1045	1050		1055
Gly	Pro	Asp	Gly	Ile	Trp	Pro	Pro	Asn	Asp	Ala	Val	Ala	Val	Pro	Leu	1060	1065		1070
Asp	Ser	Phe	Tyr	Ala	Arg	Ala	Ala	Glu	Arg	Gly	Phe	Asp	Phe	Gly	Pro	1075	1080		1085

Ala Phe Gln Gly Leu Gln Ala Ala Trp Lys Arg Gly Asp Glu Ile Phe			
1090	1095	1100	
Ala Glu Val Gly Leu Pro Thr Ala His Arg Glu Asp Ala Gly Arg Phe			
1105	1110	1115	1120
Gly Ile His Pro Ala Leu Leu Asp Ala Ala Leu Gln Ala Leu Gly Ala			
	1125	1130	1135
Ala Glu Glu Asp Pro Asp Glu Gly Trp Leu Pro Phe Ala Trp Gln Gly			
	1140	1145	1150
Val Ser Leu Lys Ala Thr Gly Ala Leu Ser Leu Arg Val His Leu Val			
	1155	1160	1165
Pro Ala Gly Ala Asn Ala Val Ser Val Phe Thr Thr Asp Thr Thr Gly			
	1170	1175	1180
Gln Ala Val Leu Ser Ile Asp Ser Leu Val Leu Arg Gln Ile Ser Asp			
1185	1190	1195	1200
Lys Gln Leu Ala Ala Ala Arg Ala Met Glu His Glu Ser Leu Phe Arg			
	1205	1210	1215
Val Asp Trp Lys Arg Ile Ser Pro Gly Ala Ala Lys Pro Val Ser Trp			
	1220	1225	1230
Ala Val Ile Gly Asn Asp Glu Leu Ala Arg Ala Cys Gly Ser Ala Leu			
	1235	1240	1245
Gly Thr Glu Leu His Pro Asp Leu Thr Gly Leu Ala Asp Pro Pro Pro			
	1250	1255	1260
Asp Val Val Val Val Pro Cys Gly Ala Ser Arg Gln Asp Leu Asp Val			
1265	1270	1275	1280
Ala Ser Glu Ala Arg Ala Ala Thr Gln Arg Met Leu Asp Leu Ile Gln			
	1285	1290	1295
Asp Trp Leu Ala Ala Ala Arg Phe Ala Gly Ser Arg Leu Val Val Val			
	1300	1305	1310
Thr Cys Gly Ala Ala Ser Thr Gly Pro Ala Glu Gly Val Ser Asp Leu			
	1315	1320	1325
Val His Ala Ala Ser Trp Gly Leu Leu Arg Ser Ala Gln Ser Glu Asn			
	1330	1335	1340
Pro Asp Arg Phe Val Leu Val Asp Val Asp Gly Thr Ala Glu Ser Trp			
1345	1350	1355	1360
Arg Ala Leu Ala Ala Ala Val Arg Ser Gly Glu Pro Gln Leu Ala Leu			
	1365	1370	1375
Arg Ala Gly Glu Val Arg Val Pro Arg Leu Ala Arg Cys Val Ala Ala			
	1380	1385	1390

Glu Asp Ser Arg Ile Pro Val Pro Gly Ala Asp Gly Thr Val Leu Ile		
1395	1400	1405
Ser Gly Gly Thr Gly Leu Leu Gly Gly Leu Val Ala Arg His Leu Val		
1410	1415	1420
Ala Glu Arg Gly Val Arg Arg Leu Val Leu Ala Gly Arg Arg Gly Trp		
1425	1430	1435 1440
Ser Ala Pro Gly Val Thr Asp Leu Val Asp Glu Leu Val Gly Leu Gly		
1445	1450	1455
Ala Ala Val Glu Val Ala Ser Cys Asp Val Gly Asp Arg Ala Gln Leu		
1460	1465	1470
Asp Arg Leu Leu Thr Thr Ile Ser Ala Glu Phe Pro Leu Arg Gly Val		
1475	1480	1485
Val His Ala Ala Gly Ala Leu Ala Asp Gly Val Val Glu Ser Leu Thr		
1490	1495	1500
Pro Glu His Val Ala Lys Val Phe Gly Pro Lys Ala Ala Gly Ala Trp		
1505	1510	1515 1520
His Leu His Glu Leu Thr Leu Asp Leu Asp Leu Ser Phe Phe Val Leu		
1525	1530	1535
Phe Ser Ser Phe Ser Gly Val Ala Gly Ala Ala Gly Gln Gly Asn Tyr		
1540	1545	1550
Ala Ala Ala Asn Ala Phe Leu Asp Gly Leu Ala Gln His Arg Arg Thr		
1555	1560	1565
Ala Gly Leu Pro Ala Val Ser Leu Ala Trp Gly Leu Trp Glu Gln Pro		
1570	1575	1580
Ser Gly Met Thr Gly Ala Leu Asp Ala Ala Gly Arg Ser Arg Ile Ala		
1585	1590	1595 1600
Arg Thr Asn Pro Pro Met Ser Ala Pro Asp Gly Leu Arg Leu Phe Glu		
1605	1610	1615
Met Ala Phe Arg Val Pro Gly Glu Ser Leu Leu Val Pro Val His Val		
1620	1625	1630
Asp Leu Asn Ala Leu Arg Ala Asp Ala Ala Asp Gly Gly Val Pro Ala		
1635	1640	1645
Leu Leu Arg Asp Leu Val Pro Ala Pro Val Arg Arg Ser Ala Val Asn		
1650	1655	1660
Glu Ser Ala Asp Val Asn Gly Leu Val Gly Arg Leu Arg Arg Leu Pro		
1665	1670	1675 1680
Asp Leu Asp Gln Glu Thr Gln Leu Leu Gly Leu Val Arg Glu His Val		
1685	1690	1695

Ser Ala Val Leu Gly His Ser Gly Ala Val Glu Val Gly Ala Asp Arg
 1700 1705 1710

Ala Phe Arg Asp Leu Gly Phe Asp Ser Leu Ser Gly Val Glu Phe Arg
 1715 1720 1725

Asn Arg Leu Gly Gly Val Leu Gly Val Arg Leu Pro Ala Thr Ala Val
 1730 1735 1740

Phe Asp Tyr Pro Thr Pro Arg Ala Leu Val Arg Phe Leu Leu Asp Lys
 1745 1750 1755 1760

Leu Ile Gly Gly Val Glu Ala Pro Thr Pro Ala Pro Ala Ala Val Ala
 1765 1770 1775

Ala Val Thr Ala Asp Asp Pro Val Val Ile Val Gly Met Gly Cys Arg
 1780 1785 1790

Tyr Pro Gly Gly Val Ser Ser Pro Glu Glu Leu Trp Arg Leu Val Ala
 1795 1800 1805

Gly Gly Leu Asp Ala Val Ala Glu Phe Pro Asp Asp Arg Gly Trp Asp
 1810 1815 1820

Gln Ala Gly Leu Phe Asp Pro Asp Pro Asp Arg Leu Gly Thr Ser Tyr
 1825 1830 1835 1840

Val Cys Glu Gly Gly Phe Leu Arg Asp Ala Ala Glu Phe Asp Ala Gly
 1845 1850 1855

Phe Phe Gly Ile Ser Pro Arg Glu Ala Leu Ala Met Asp Pro Gln Gln
 1860 1865 1870

Arg Leu Leu Leu Glu Val Ala Trp Glu Thr Val Glu Arg Ala Gly Ile
 1875 1880 1885

Asp Pro Leu Ser Leu Arg Gly Ser Arg Thr Gly Val Phe Ala Gly Leu
 1890 1895 1900

Met His His Asp Tyr Gly Ala Arg Phe Ile Thr Arg Ala Pro Glu Gly
 1905 1910 1915 1920

Phe Glu Gly Tyr Leu Gly Asn Gly Ser Ala Gly Gly Val Phe Ser Gly
 1925 1930 1935

Arg Val Ala Tyr Ser Phe Gly Phe Glu Gly Pro Ala Val Thr Val Asp
 1940 1945 1950

Thr Ala Cys Ser Ser Ser Leu Val Ala Leu His Leu Ala Gly Gln Ala
 1955 1960 1965

Leu Arg Ser Gly Glu Cys Asp Leu Ala Leu Ala Gly Gly Val Thr Val
 1970 1975 1980

Met Ala Thr Pro Gly Met Phe Val Glu Phe Ser Arg Gln Arg Gly Leu
 1985 1990 1995 2000

Ala	Ala	Asp	Gly	Arg	Cys	Lys	Ser	Phe	Ala	Ala	Ala	Ala	Asp	Gly	Thr			
			2005						2010					2015				
Gly	Trp	Gly	Glu	Gly	Ala	Gly	Leu	Val	Leu	Leu	Glu	Arg	Leu	Ser	Asp			
		2020					2025						2030					
Ala	Arg	Arg	Asn	Gly	His	Ala	Val	Leu	Ala	Val	Val	Arg	Gly	Ser	Ala			
		2035					2040					2045						
Val	Asn	Gln	Asp	Gly	Ala	Ser	Asn	Gly	Leu	Thr	Ala	Pro	Asn	Gly	Pro			
	2050					2055					2060							
Ser	Gln	Gln	Arg	Val	Ile	Thr	Gln	Ala	Leu	Ala	Ser	Ala	Gly	Leu	Ser			
2065				2070					2075					2080				
Val	Ser	Asp	Val	Asp	Ala	Val	Glu	Ala	His	Gly	Thr	Gly	Thr	Arg	Leu			
		2085					2090							2095				
Gly	Asp	Pro	Ile	Glu	Ala	Gln	Ala	Leu	Ile	Ala	Thr	Tyr	Gly	Gln	Gly			
		2100					2105						2110					
Arg	Asp	Ser	Asp	Arg	Pro	Leu	Trp	Leu	Gly	Ser	Val	Lys	Ser	Asn	Ile			
	2115					2120					2125							
Gly	His	Thr	Gln	Ala	Ala	Ala	Gly	Val	Ala	Gly	Val	Ile	Lys	Met	Val			
	2130				2135				2140									
Met	Ala	Met	Arg	His	Gly	Gln	Leu	Pro	Ala	Thr	Leu	His	Val	Asp	Glu			
2145				2150					2155					2160				
Pro	Thr	Ser	Glu	Val	Asp	Trp	Ser	Ala	Gly	Asp	Val	Gln	Leu	Leu	Thr			
		2165					2170					2175						
Glu	Asn	Thr	Pro	Trp	Pro	Gly	Asn	Ser	His	Pro	Arg	Arg	Val	Gly	Val			
	2180					2185					2190							
Ser	Ser	Phe	Gly	Ile	Ser	Gly	Thr	Asn	Ala	His	Val	Ile	Leu	Glu	Gln			
	2195					2200					2205							
Ala	Ser	Lys	Thr	Pro	Asp	Glu	Thr	Ala	Asp	Lys	Ser	Gly	Pro	Asp	Ser			
	2210				2215						2220							
Glu	Ser	Thr	Val	Asp	Leu	Pro	Ala	Val	Pro	Leu	Ile	Val	Ser	Gly	Arg			
2225				2230					2235					2240				
Thr	Pro	Ala	Ala	Leu	Ser	Ala	Gln	Ala	Ser	Ala	Leu	Leu	Ser	Tyr	Leu			
		2245					2250						2255					
Gly	Glu	Arg	Gly	Asp	Ile	Ser	Thr	Leu	Asp	Ala	Ala	Phe	Ser	Leu	Ala			
	2260						2265					2270						
Ser	Ser	Arg	Ala	Ala	Leu	Glu	Glu	Arg	Ala	Val	Val	Leu	Gly	Ala	Asp			
	2275					2280					2285							
Arg	Glu	Thr	Leu	Leu	Ser	Gly	Leu	Glu	Ala	Leu	Ala	Ser	Gly	Arg	Glu			
	2290					2295					2300							

Ala Ser Gly Val Val Ser Gly Ser Pro Val Ser Gly Gly Val Gly Phe			
2305	2310	2315	2320
Val Phe Ala Gly Gln Gly Gly Gln Trp Leu Gly Met Gly Arg Gly Leu			
2325	2330		2335
Tyr Ser Val Phe Pro Val Phe Ala Asp Ala Phe Asp Glu Ala Cys Ala			
2340	2345		2350
Gly Leu Asp Ala His Leu Gly Gln Asp Val Gly Val Arg Asp Val Val			
2355	2360		2365
Phe Gly Ser Asp Gly Ser Leu Leu Asp Arg Thr Leu Trp Ala Gln Ser			
2370	2375		2380
Gly Leu Phe Ala Leu Gln Val Gly Leu Leu Ser Leu Leu Gly Ser Trp			
2385	2390	2395	2400
Gly Val Arg Pro Gly Val Val Leu Gly His Ser Val Gly Glu Phe Ala			
2405	2410		2415
Ala Ala Val Ala Ala Gly Val Leu Ser Leu Pro Asp Ala Ala Arg Met			
2420	2425		2430
Val Ala Gly Arg Ala Arg Leu Met Gln Ala Leu Pro Ser Gly Gly Ala			
2435	2440		2445
Met Leu Ala Val Ala Ala Gly Glu Glu Gln Leu Arg Pro Leu Leu Ala			
2450	2455		2460
Asp Arg Val Asp Gly Ala Gly Ile Ala Ala Val Asn Ala Pro Glu Ser			
2465	2470	2475	2480
Val Val Leu Ser Gly Asp Arg Glu Val Leu Asp Asp Ile Ala Gly Ala			
2485	2490		2495
Leu Asp Gly Gln Gly Ile Arg Trp Arg Arg Leu Arg Val Ser His Ala			
2500	2505		2510
Phe His Ser Tyr Arg Met Asp Pro Met Leu Gln Glu Phe Ala Glu Ile			
2515	2520		2525
Ala Arg Ser Val Asp Tyr Arg Arg Gly Asp Leu Pro Val Val Ser Thr			
2530	2535		2540
Leu Thr Gly Glu Leu Asp Thr Ala Gly Val Met Ala Thr Pro Glu Tyr			
2545	2550	2555	2560
Trp Val Arg Gln Val Arg Glu Pro Val Arg Phe Ala Asp Gly Val Arg			
2565	2570		2575
Val Leu Ala Gln Gln Gly Val Ala Thr Ile Phe Glu Leu Gly Pro Asp			
2580	2585		2590
Ala Thr Leu Ser Ala Leu Ile Pro Asp Cys His Ser Trp Ala Asp Gln			
2595	2600		2605

Ala Met Pro Ile Pro Met Leu Arg Lys Asp Arg Thr Glu Thr Glu Thr			
2610	2615	2620	
Val Val Ala Ala Val Ala Arg Ala His Thr Arg Gly Val Pro Val Glu			
2625	2630	2635	2640
Trp Ser Ala Tyr Phe Ala Gly Thr Gly Ala Arg Arg Val Glu Leu Pro			
2645	2650	2655	
Thr Tyr Ala Phe Gln Arg Gln Arg Tyr Trp Leu Glu Thr Ser Asp Tyr			
2660	2665	2670	
Gly Asp Val Thr Gly Ile Gly Leu Ala Ala Ala Glu His Pro Leu Leu			
2675	2680	2685	
Gly Ala Val Val Ala Leu Ala Asp Gly Asp Gly Met Val Leu Thr Gly			
2690	2695	2700	
Arg Leu Ser Val Gly Thr His Pro Trp Leu Ala Gln His Arg Val Leu			
2705	2710	2715	2720
Gly Glu Val Val Val Pro Gly Thr Ala Ile Leu Glu Met Ala Leu His			
2725	2730	2735	
Ala Gly Ala Arg Leu Gly Cys Asp Arg Val Glu Glu Leu Thr Leu Glu			
2740	2745	2750	
Thr Pro Leu Val Val Pro Glu Arg Ala Ala Gly Ala Gly Ser Arg Gly			
2755	2760	2765	
Pro Ala Gly Gly Thr Thr Val Ser Ile Glu Thr Ala Glu Glu Arg Val			
2770	2775	2780	
Arg Thr Asn Asp Ala Ile Glu Ile Gln Leu Leu Val Asn Ala Pro Asp			
2785	2790	2795	2800
Glu Gly Gly Arg Arg Arg Val Ser Leu Tyr Ser Arg Pro Ala Gly Gly			
2805	2810	2815	
Ser Arg Gly Gly Gly Trp Thr Arg His Ala Thr Gly Glu Leu Val Val			
2820	2825	2830	
Gly Thr Thr Gly Gly Arg Ala Val Pro Asp Trp Ser Ala Glu Gly Ala			
2835	2840	2845	
Glu Ser Ile Ala Leu Asp Glu Phe Tyr Val Ala Leu Ala Gly Asn Gly			
2850	2855	2860	
Phe Glu Tyr Gly Pro Leu Phe Gln Gly Leu Gln Ala Ala Trp Arg Arg			
2865	2870	2875	2880
Gly Asp Glu Val Leu Ala Glu Ile Ala Pro Pro Ala Glu Ala Asp Ala			
2885	2890	2895	
Met Ala Ser Gly Tyr Leu Leu Asp Pro Ala Leu Leu Asp Ala Ala Leu			
2900	2905	2910	

Gln Ala Ser Ala Leu Gly Asp Arg Pro Glu Gln Gly Gly Ala Trp Leu
 2915 2920 2925

Pro Phe Ser Phe Thr Gly Val Glu Leu Ser Ala Pro Ala Gly Thr Ile
 2930 2935 2940

Ser Arg Val Arg Leu Glu Thr Arg Arg Pro Asp Ala Ile Ser Val Ala
 2945 2950 2955 2960

Val Met Asp Glu Ser Gly Arg Leu Leu Ala Ser Ile Asp Ser Leu Arg
 2965 2970 2975

Leu Arg Ser Val Ser Ser Gly Gln Leu Ala Asn Arg Asp Ala Val Arg
 2980 2985 2990

Asp Ala Leu Phe Glu Val Thr Trp Glu Pro Val Ala Thr Gln Ser Thr
 2995 3000 3005

Glu Pro Gly Arg Trp Ala Leu Leu Gly Asp Thr Ala Cys Gly Lys Asp
 3010 3015 3020

Asp Leu Ile Lys Leu Ala Thr Asp Ser Ala Asp Arg Cys Ala Asp Leu
 3025 3030 3035 3040

Ala Ala Leu Ala Glu Lys Leu Asp Ser Ser Ala Leu Val Pro Asp Val
 3045 3050 3055

Val Val Tyr Cys Ala Gly Glu Gln Ala Asp Pro Gly Thr Gly Ala Ala
 3060 3065 3070

Ala Leu Ala Glu Thr Gln Gln Thr Leu Ala Leu Leu Gln Ala Trp Leu
 3075 3080 3085

Ala Glu Pro Arg Leu Ala Glu Ala Arg Leu Val Val Val Thr Cys Ala
 3090 3095 3100

Ala Val Thr Thr Ala Pro Ser Asp Gly Ala Ser Glu Leu Ala His Ala
 3105 3110 3115 3120

Pro Leu Trp Gly Leu Leu Arg Ala Ala Gln Val Glu Asn Pro Gly Gln
 3125 3130 3135

Phe Val Leu Ala Asp Val Asp Gly Thr Ala Glu Ser Trp Arg Ala Leu
 3140 3145 3150

Pro Ser Ala Leu Gly Ser Met Glu Pro Gln Leu Ala Leu Arg Lys Gly
 3155 3160 3165

Ala Val Arg Ala Pro Arg Leu Ala Ser Val Ala Gly Gln Ile Asp Val
 3170 3175 3180

Pro Ala Val Val Ala Asp Pro Asp Arg Thr Val Leu Ile Ser Gly Gly
 3185 3190 3195 3200

Thr Gly Leu Leu Gly Gly Ala Val Ala Arg His Leu Val Thr Glu Arg
 3205 3210 3215

Gly Val Arg Arg Leu Val Leu Thr Gly Arg Arg Gly Trp Asp Ala Pro
 3220 3225 3230

Gly Ile Thr Glu Leu Val Gly Glu Leu Asn Gly Leu Gly Ala Val Val
 3235 3240 3245

Asp Val Val Ala Cys Asp Val Ala Asp Arg Ala Asp Leu Glu Ser Leu
 3250 3255 3260

Leu Ala Ala Val Pro Ala Glu Phe Pro Leu Cys Gly Val Val His Ala
 3265 3270 3275 3280

Ala Gly Ala Leu Ala Asp Gly Val Ile Glu Ser Leu Ser Pro Asp Asp
 3285 3290 3295

Val Gly Ala Val Phe Gly Pro Lys Ala Ala Gly Ala Trp Asn Leu His
 3300 3305 3310

Glu Leu Thr Arg Asp Thr Asp Leu Ser Phe Phe Ala Leu Phe Ser Ser
 3315 3320 3325

Leu Ser Gly Val Ala Gly Ala Pro Gly Gln Gly Asn Tyr Ala Ala Ala
 3330 3335 3340

Asn Ala Phe Leu Asp Ala Leu Ala His Tyr Arg Arg Ser Gln Gly Leu
 3345 3350 3355 3360

Pro Ala Val Ser Leu Ala Trp Gly Leu Trp Glu Gln Pro Ser Gly Met
 3365 3370 3375

Thr Glu Thr Leu Ser Glu Val Asp Arg Ser Arg Ile Ala Arg Ala Asn
 3380 3385 3390

Pro Pro Leu Ser Thr Lys Glu Gly Leu Arg Leu Phe Asp Ala Gly Leu
 3395 3400 3405

Ala Leu Asp Arg Ala Ala Val Val Pro Ala Lys Leu Asp Arg Thr Phe
 3410 3415 3420

Leu Ala Glu Gln Ala Arg Ser Gly Ser Leu Pro Ala Leu Leu Thr Ala
 3425 3430 3435 3440

Leu Val Pro Pro Ile Arg Arg Asn Arg Arg Ala Ser Gly Thr Glu Leu
 3445 3450 3455

Ala Asp Glu Gly Thr Leu Leu Gly Val Val Arg Glu His Ala Ala Ala
 3460 3465 3470

Val Leu Gly Tyr Ser Ser Ala Ala Asp Val Gly Val Glu Arg Ala Phe
 3475 3480 3485

Arg Asp Leu Gly Phe Asp Ser Leu Ser Gly Val Glu Leu Arg Asn Arg
 3490 3495 3500

Leu Ala Gly Val Leu Gly Val Arg Leu Pro Ala Thr Ala Val Phe Asp
 3505 3510 3515 3520

Tyr Pro Thr Pro Arg Ala Leu Ala Arg Phe Leu His Gln Glu Leu Ala
 3525 3530 3535
 Asp Glu Ile Ala Thr Thr Pro Ala Pro Val Thr Thr Thr Arg Ala Pro
 3540 3545 3550
 Val Ala Glu Asp Asp Leu Val Ala Ile Val Gly Met Gly Cys Arg Phe
 3555 3560 3565
 Pro Gly Gln Val Ser Ser Pro Glu Glu Leu Trp Arg Leu Val Ala Gly
 3570 3575 3580
 Gly Val Asp Ala Val Ala Asp Phe Pro Ala Asp Arg Gly Trp Asp Leu
 3585 3590 3595 3600
 Ala Gly Leu Phe Asp Pro Asp Pro Glu Arg Ala Gly Lys Thr Tyr Val
 3605 3610 3615
 Arg Glu Gly Ala Phe Leu Thr Asp Ala Asp Arg Phe Asp Ala Gly Phe
 3620 3625 3630
 Phe Gly Ile Ser Pro Arg Glu Ala Leu Ala Met Asp Pro Gln Gln Arg
 3635 3640 3645
 Leu Leu Leu Glu Leu Ser Trp Glu Ala Ile Glu Arg Ala Gly Ile Asp
 3650 3655 3660
 Pro Gly Ser Leu Arg Gly Ser Arg Thr Gly Val Phe Ala Gly Leu Met
 3665 3670 3675 3680
 Tyr His Asp Tyr Gly Ala Arg Phe Ala Ser Arg Ala Pro Glu Gly Phe
 3685 3690 3695
 Glu Gly Tyr Leu Gly Asn Gly Ser Ala Gly Ser Val Ala Ser Gly Arg
 3700 3705 3710
 Ile Ala Tyr Ser Phe Gly Phe Glu Gly Pro Ala Val Thr Val Asp Thr
 3715 3720 3725
 Ala Cys Ser Ser Ser Leu Val Ala Leu His Leu Ala Gly Gln Ser Leu
 3730 3735 3740
 Arg Ser Gly Glu Cys Asp Leu Ala Leu Ala Gly Gly Val Thr Val Met
 3745 3750 3755 3760
 Ser Thr Pro Gly Thr Phe Val Glu Phe Ser Arg Gln Arg Gly Leu Ala
 3765 3770 3775
 Pro Asp Gly Arg Cys Lys Ser Phe Ala Glu Ser Ala Asp Gly Thr Gly
 3780 3785 3790
 Trp Gly Glu Gly Ala Gly Leu Val Leu Leu Glu Arg Leu Ser Asp Ala
 3795 3800 3805
 Arg Arg Asn Gly His Arg Val Leu Ala Val Val Arg Gly Ser Ala Val
 3810 3815 3820

Asn Gln Asp Gly Ala Ser Asn Gly Leu Thr Ala Pro Asn Gly Pro Ser			
3825	3830	3835	3840
Gln Gln Arg Val Ile Gln Gln Ala Leu Ala Ser Ala Gly Leu Ser Val			
	3845	3850	3855
Ser Asp Val Asp Ala Val Glu Ala His Gly Thr Gly Thr Arg Leu Gly			
	3860	3865	3870
Asp Pro Ile Glu Ala Gln Ala Leu Ile Ala Thr Tyr Gly Arg Asp Arg			
	3875	3880	3885
Asp Pro Gly Arg Pro Leu Trp Leu Gly Ser Val Lys Ser Asn Ile Gly			
	3890	3895	3900
His Thr Gln Ala Ala Ala Gly Val Ala Gly Val Ile Lys Met Val Met			
3905	3910	3915	3920
Ala Met Arg His Gly Gln Leu Pro Arg Thr Leu His Val Asp Ala Pro			
	3925	3930	3935
Ser Ser Gln Val Asp Trp Ser Ala Gly Arg Val Gln Leu Leu Thr Glu			
	3940	3945	3950
Asn Thr Pro Trp Pro Asp Ser Gly Arg Pro Cys Arg Val Gly Val Ser			
	3955	3960	3965
Ser Phe Gly Ile Ser Gly Thr Asn Ala His Val Ile Leu Glu Gln Ser			
	3970	3975	3980
Thr Gly Gln Met Asp Gln Ala Ala Glu Pro Asp Ser Ser Pro Val Leu			
3985	3990	3995	4000
Asp Val Pro Val Val Pro Trp Val Val Ser Gly Lys Thr Pro Glu Ala			
	4005	4010	4015
Leu Ser Ala Gln Ala Ala Thr Leu Ala Thr Tyr Leu Asp Gln Asn Val			
	4020	4025	4030
Asp Val Ser Pro Leu Asp Val Gly Ile Ser Leu Ala Val Thr Arg Ser			
	4035	4040	4045
Ala Leu Asp Glu Arg Ala Val Val Leu Gly Ser Asp Arg Asp Thr Leu			
	4050	4055	4060
Leu Ser Gly Leu Asn Ala Leu Ala Ala Gly His Glu Ala Ala Gly Val			
4065	4070	4075	4080
Val Thr Gly Pro Val Gly Ile Gly Gly Arg Thr Gly Phe Val Phe Ala			
	4085	4090	4095
Gly Gln Gly Gly Gln Trp Leu Gly Met Gly Arg Arg Leu Tyr Ser Glu			
	4100	4105	4110
Phe Pro Ala Phe Ala Gly Ala Phe Asp Glu Ala Cys Ala Glu Leu Asp			
	4115	4120	4125

Ala Asn Leu Gly Arg Glu Val Gly Val Arg Asp Val Val Phe Gly Ser
 4130 4135 4140

Asp Glu Ser Leu Leu Asp Arg Thr Leu Trp Ala Gln Ser Gly Leu Phe
 4145 4150 4155 4160

Ala Leu Gln Val Gly Leu Trp Glu Leu Leu Gly Thr Trp Gly Val Arg
 4165 4170 4175

Pro Ser Val Val Leu Gly His Ser Val Gly Glu Leu Ala Ala Ala Phe
 4180 4185 4190

Ala Ala Gly Val Leu Ser Met Ala Glu Ala Ala Arg Leu Val Ala Gly
 4195 4200 4205

Arg Ala Arg Leu Met Gln Ala Leu Pro Ser Gly Gly Ala Met Leu Ala
 4210 4215 4220

Val Ser Ala Thr Glu Ala Arg Val Gly Pro Leu Leu Asp Gly Val Arg
 4225 4230 4235 4240

Asp Arg Val Gly Val Ala Ala Val Asn Ala Pro Gly Ser Val Val Leu
 4245 4250 4255

Ser Gly Asp Arg Asp Val Leu Asp Gly Ile Ala Gly Arg Leu Asp Gly
 4260 4265 4270

Gln Gly Ile Arg Ser Arg Trp Leu Arg Val Ser His Ala Phe His Ser
 4275 4280 4285

His Arg Met Asp Pro Met Leu Ala Glu Phe Ala Glu Leu Ala Arg Ser
 4290 4295 4300

Val Asp Tyr Arg Ser Pro Arg Leu Pro Ile Val Ser Thr Leu Thr Gly
 4305 4310 4315 4320

Asn Leu Asp Asp Val Gly Val Met Ala Thr Pro Glu Tyr Trp Val Arg
 4325 4330 4335

Gln Val Arg Glu Pro Val Arg Phe Ala Asp Gly Val Gln Ala Leu Val
 4340 4345 4350

Asp Gln Gly Val Asp Thr Ile Val Glu Leu Gly Pro Asp Gly Ala Leu
 4355 4360 4365

Ser Ser Leu Val Gln Glu Cys Val Ala Glu Ser Gly Arg Ala Thr Gly
 4370 4375 4380

Ile Pro Leu Val Arg Arg Asp Arg Asp Glu Val Arg Thr Val Leu Asp
 4385 4390 4395 4400

Ala Leu Ala Gln Thr His Thr Arg Gly Gly Ala Val Asp Trp Gly Ser
 4405 4410 4415

Phe Phe Ala Gly Thr Arg Ala Thr Gln Val Asp Leu Pro Thr Tyr Ala
 4420 4425 4430

Phe Gln Arg Gln Arg Tyr Trp Leu Glu Pro Ser Asp Ser Gly Asp Val
4435 4440 4445
Thr Gly Val Gly Leu Thr Gly Ala Glu His Pro Leu Leu Gly Ala Val
4450 4455 4460
Val Pro Val Ala Gly Gly Asp Glu Val Leu Leu Thr Gly Arg Leu Ser
4465 4470 4475 4480
Val Gly Thr His Pro Trp Leu Ala Glu His Arg Val Leu Gly Glu Val
4485 4490 4495
Val Val Pro Gly Thr Ala Leu Leu Glu Met Ala Trp Arg Ala Gly Ser
4500 4505 4510
Gln Val Gly Cys Glu Arg Val Glu Glu Leu Thr Leu Glu Ala Pro Leu
4515 4520 4525
Val Leu Pro Glu Arg Gly Ala Ala Ala Val Gln Leu Ala Val Gly Ala
4530 4535 4540
Pro Asp Glu Ala Gly Arg Arg Ser Leu Gln Leu Tyr Ser Arg Gly Ala
4545 4550 4555 4560
Asp Glu Asp Gly Asp Trp Arg Arg Ile Ala Ser Gly Leu Leu Ala Gln
4565 4570 4575
Ala Asn Ala Val Pro Pro Ala Asp Ser Thr Ala Trp Pro Pro Asp Gly
4580 4585 4590
Ala Gly Gln Val Asp Leu Ala Glu Phe Tyr Glu Arg Leu Ala Glu Arg
4595 4600 4605
Gly Leu Thr Tyr Gly Pro Val Phe Gln Gly Leu Arg Ala Ala Trp Arg
4610 4615 4620
His Gly Asp Asp Ile Phe Ala Glu Leu Ala Gly Ser Pro Asp Ala Ser
4625 4630 4635 4640
Gly Phe Gly Ile His Pro Ala Leu Leu Asp Ala Ala Leu His Ala Met
4645 4650 4655
Ala Leu Gly Ala Ser Pro Asp Ser Glu Ala Arg Leu Pro Phe Ser Trp
4660 4665 4670
Arg Gly Ala Gln Leu Tyr Arg Ala Glu Gly Ala Ala Leu Arg Val Arg
4675 4680 4685
Leu Ser Pro Leu Gly Ser Gly Ala Val Ser Leu Thr Leu Val Asp Ala
4690 4695 4700
Thr Gly Arg Arg Val Ala Ala Val Glu Ser Leu Ser Thr Arg Pro Val
4705 4710 4715 4720
Ser Thr Asp Gln Ile Gly Ala Gly Arg Gly Asp Gln Glu Arg Leu Leu
4725 4730 4735

His Val Glu Trp Val Arg Ser Ala Glu Ser Ala Gly Met Ser Leu Thr
 4740 4745 4750
 Ser Cys Ala Val Val Gly Leu Gly Glu Pro Glu Trp His Ala Ala Leu
 4755 4760 4765
 Lys Thr Thr Gly Val Gln Val Glu Ser His Ala Asp Leu Ala Ser Leu
 4770 4775 4780
 Ala Thr Glu Val Ala Lys Arg Gly Ser Ala Pro Gly Ala Val Ile Val
 4785 4790 4795 4800
 Pro Cys Pro Arg Pro Arg Ala Met Gln Glu Leu Pro Thr Ala Ala Arg
 4805 4810 4815
 Arg Ala Thr Gln Gln Ala Met Ala Met Leu Gln Gln Trp Leu Ala Asp
 4820 4825 4830
 Asp Arg Phe Val Ser Thr Arg Leu Ile Leu Leu Thr His Arg Ala Val
 4835 4840 4845
 Ser Ala Val Ala Gly Glu Asp Val Leu Asp Leu Val His Ala Pro Leu
 4850 4855 4860
 Trp Gly Leu Val Arg Ser Ala Gln Ala Glu His Pro Asp Arg Phe Ala
 4865 4870 4875 4880
 Leu Ile Asp Met Asp Asp Glu Arg Ala Ser Gln Thr Ala Leu Ala Glu
 4885 4890 4895
 Ala Leu Thr Ala Gly Glu Ala Gln Leu Ala Val Arg Ser Gly Val Val
 4900 4905 4910
 Leu Ala Pro Arg Leu Gly Gln Val Lys Val Ser Gly Gly Glu Ala Phe
 4915 4920 4925
 Arg Trp Asp Glu Gly Thr Val Leu Val Thr Gly Gly Thr Gly Gly Leu
 4930 4935 4940
 Gly Ala Leu Leu Ala Arg His Leu Val Ser Ala His Gly Val Arg His
 4945 4950 4955 4960
 Leu Leu Leu Ala Ser Arg Arg Gly Leu Ala Ala Pro Gly Ala Asp Glu
 4965 4970 4975
 Leu Val Ala Glu Leu Glu Gln Ala Gly Ala Asp Val Ala Val Val Ala
 4980 4985 4990
 Cys Asp Ser Ala Asp Arg Asp Ser Leu Ala Arg Leu Val Ala Ser Val
 4995 5000 5005
 Pro Ala Glu Asn Pro Leu Arg Val Val Val His Ala Ala Gly Val Leu
 5010 5015 5020
 Asp Asp Gly Val Leu Met Ser Met Ser Pro Glu Arg Leu Asp Ala Val
 5025 5030 5035 5040

Leu Arg Pro Lys Val Asp Ala Ala Trp Tyr Leu His Glu Leu Thr Arg
 5045 5050 5055
 Glu Leu Gly Leu Ser Ala Phe Val Leu Phe Ser Ser Val Ala Gly Leu
 5060 5065 5070
 Phe Gly Gly Ala Gly Gln Ser Asn Tyr Ala Ala Gly Asn Ala Phe Leu
 5075 5080 5085
 Asp Ala Leu Ala His Cys Arg Gln Ala Gln Gly Leu Pro Ala Leu Ser
 5090 5095 5100
 Leu Ala Ser Gly Leu Trp Ala Ser Ile Asp Gly Met Ala Gly Asp Leu
 5105 5110 5115 5120
 Ala Ala Ala Asp Val Glu Arg Leu Ser Arg Ala Gly Ile Gly Pro Leu
 5125 5130 5135
 Ser Ala Pro Gly Gly Leu Ala Leu Phe Asp Ala Ala Val Gly Ser Asp
 5140 5145 5150
 Glu Pro Leu Leu Ala Pro Val Arg Leu Asp Val Glu Ala Leu Arg Val
 5155 5160 5165
 Gln Ala Arg Ser Val Gln Thr Arg Ile Pro Glu Met Leu His Gly Met
 5170 5175 5180
 Ala Met Gly Pro Ser Arg Arg Thr Pro Phe Thr Ser Arg Val Glu Pro
 5185 5190 5195 5200
 Leu His Glu Arg Leu Ala Gly Leu Ser Glu Gly Glu Arg Arg Gln Gln
 5205 5210 5215
 Val Leu Gln Arg Val Arg Ala Asp Ile Ala Val Val Leu Gly His Gly
 5220 5225 5230
 Arg Ser Ser Asp Val Asp Ile Glu Lys Pro Leu Ala Glu Leu Gly Phe
 5235 5240 5245
 Asp Ser Leu Thr Ala Ile Glu Leu Arg Asn Arg Leu Ala Thr Ala Thr
 5250 5255 5260
 Gly Leu Arg Leu Pro Ala Thr Leu Ala Phe Asp His Gly Thr Ala Ala
 5265 5270 5275 5280
 Ala Leu Ala Gln His Val Cys Ala Gln Leu Gly Thr Ala Thr Ala Pro
 5285 5290 5295
 Ala Pro Arg Arg Thr Asp Asp Asn Asp Ala Thr Glu Pro Val Arg Ser
 5300 5305 5310
 Leu Phe Gln Gln Ala Tyr Ala Ala Gly Arg Ile Leu Asp Gly Met Asp
 5315 5320 5325
 Leu Val Lys Val Ala Ala Gln Leu Arg Pro Val Phe Gly Ser Pro Gly
 5330 5335 5340

Glu Leu Glu Ser Leu Pro Lys Pro Val Gln Leu Ser Arg Gly Pro Glu
5345 5350 5355 5360

Glu Leu Ala Leu Val Cys Met Pro Ala Leu Ile Gly Met Pro Pro Ala
5365 5370 5375

Gln Gln Tyr Ala Arg Ile Ala Ala Gly Phe Arg Asp Val Arg Asp Val
5380 5385 5390

Ser Val Ile Pro Met Pro Gly Phe Ile Ala Gly Glu Pro Leu Pro Ser
5395 5400 5405

Ala Ile Glu Val Ala Val Arg Thr Gln Ala Glu Ala Val Leu Gln Glu
5410 5415 5420

Phe Ala Gly Gly Ser Phe Val Leu Val Gly His Ser Ser Gly Gly Trp
5425 5430 5435 5440

Leu Ala His Glu Val Ala Gly Glu Leu Glu Arg Arg Gly Val Val Pro
5445 5450 5455

Ala Gly Val Val Leu Leu Asp Thr Tyr Ile Pro Gly Glu Ile Thr Pro
5460 5465 5470

Arg Phe Ser Val Ala Met Ala His Arg Thr Tyr Glu Lys Leu Ala Thr
5475 5480 5485

Phe Thr Asp Met Gln Asp Val Gly Ile Thr Ala Met Gly Gly Tyr Phe
5490 5495 5500

Arg Met Phe Thr Glu Trp Thr Pro Thr Pro Ile Gly Ala Pro Thr Leu
5505 5510 5515 5520

Phe Val Arg Thr Glu Asp Cys Val Ala Asp Pro Glu Gly Arg Pro Trp
5525 5530 5535

Thr Asp Asp Ser Trp Arg Pro Gly Trp Thr Leu Ala Asp Ala Thr Val
5540 5545 5550

Gln Val Pro Gly Asp His Phe Ser Met Met Asp Glu His Ala Gly Ser
5555 5560 5565

Thr Ala Gln Ala Val Ala Ser Trp Leu Asp Lys Leu Asn Gln Arg Thr
5570 5575 5580

Ala Arg Gln Arg
5585

<210> 51

<211> 2363

<212> DNA

<213> *Saccharopolyspora spinosa*

<400> 51

```

ccccgggcccgg ccgtggggcgc cggggtccgcg gggcggaacg ggtctgccgg gctgaccctg 60
cgggccgcctt ggccacctcg gccgggtcctc cacgaatcct ccttggcctg ccggcgggcg 120
ttacagtttcc ggggaagtgat tttgctcgtg ttccgaatgc aggttagcgg tgttcctggg 180
gcgggttgggc aggtcccagc aacagtgggtg atatccctca taagggcgaa gcgacttcgt 240
cacgttgcgat aatgcgggat cctgcttcgt agctcgggtg gtcattgccag actgcgcacg 300
cggacctgca gcgggcccgcg aaatcccggc gaggaagggc gcgatgcgga ttctggtcac 360
cggcgaggacc ggtttcatcg gctcgacta cgttcggcag ttgctcgggtg gtgcgtaccc 420
cgcattcgcc gacgcgcagc tggctcgtgct cgacaagctc acctacgccg gcaacgaggc 480
gaacctggcg ccggtcgcgg acaacccccg gctgaagtcc gtctgcggcg acatctgcga 540
ccgcgaactg gttggcgggc tgatgtccgg cgtggacgtg gtggtgcact tcgccgccga 600
aaccacgctc gaccgctcga tcaccggctc ggacgccttc gtgatcacca acgtggtcgg 660
caccaacgtg ctgctgcagg ccgcgctcga cgcgagatc ggcaagtccg tgcacgtttc 720
caccgacgag gtctacggct ccatcgagga cggctcgtgg ccgaagacc acgcgctgga 780
gccgaattcc ccgtactcgg cggcgaaagc gggctcggac ctgctggccc gcgcctacca 840
ccgcacccac ggactgccgg tgtgcatcac ccgctgctcc aacaactacg ggccctacca 900
gttcccggag aaggtgctgc cgctgttcat cacgaacctg atggacggca gccaggtgcc 960
gctctacggc gacgggctca acgtgcggga ctggctgcac gtcagcgacc actgccgggg 1020
catccagctg gtggccgact ccgggcgcgc gggcgagatc tacaacatcg gcggcgccac 1080
cgagctgacc aacaacgagc tgaccgagcg gctgctggca gagctgggcc tcgactgggtc 1140
ggtggtgcgg ccggtcaccg accgcaaggg ccacgaccgc cgctactcgg tggaccacag 1200
caagatcgtc gaggaactgg ggtacgcgcc gcaggtcgac ttcgagaccg ggctgcgcga 1260
gacaatccgc tggtagcagg acaaccggga ctggtgggag ccgctgaagg ccgatcggc 1320
ggtggtcga tgagtcgct cgccgtgctg gtgcccggcg gccgcggcca gctgggctcg 1380
gagctggccc ggatcctccc cgcgcggacg ggggcgctgg tgcaccggcc gggttccggg 1440
gaactggacg tcaccgacgc cgaggaggtc gccgacgctg tgggttcctt cgcgagacg 1500
gcgaaggacg cggagctgcg accggtgggtg atcaacgccg cggcgtacac ggcggtggac 1560
gcggccgagt ccgaccggga ccgcgcggcc cggatcaacg ccgaaggcgc ggcctcgctg 1620
gcgaaagcgt gccggagcag cggctcgtcc ctggtgcacg tgtcgacgga ttacgtgttc 1680
cccgtgatg gggcccggcc gtacgagccg acggaccgca ccgggcccgcg atcgggtctac 1740
gggcgcacca agctcgaagg cgaacgggcc gtgctggagt ccggcgcgcg ggcctgggtg 1800
gtgcgcacgg catgggtgta cggcgcgagc ggcaagaact tcctgaaaac gatgatccgc 1860
ctctcggggg agcgcgacac gctgtccgtt gtggacgatc agatcggctc gccgacttgg 1920
gcggcggaac tggcgagcgg cctgctggag ctggccgaac gggctcgcca acgccgtgga 1980
ccggagcaga aggtgctgca ctgcaccaat tccggccagg tgacctggtg cgagttcgcg 2040
cgggcgatct tcgcggaatt cggcctggac gagaaccgcg tccaccctg cagcagggcg 2100
gacttcccc tcccggcgca ccgcccggcc tactcgggtc tgtccgacgt ggcgtggcga 2160
gaggcgggcc tgaccccgat gcgcacctgg cgggaagccc tggcgggcgc cttcgagaaa 2220
gacggcgaaa cctccgaac ccgctgacca gtcacccgga gggcgcgagt agccccggca 2280
gggcgcttc gacgcgatc cggctggcgc ggtgcgcaca atgggtgtcg ccggggcgag 2340
gaaggaaggc caggtgcccc ggg

```

<210> 52

<211> 990

<212> DNA

<213> *Saccharopolyspora spinosa*

<220>

<221> CDS

<222> (1)..(987)

<223> ORF23; dNDP-glucose-4,6-dehydratase

<400> 52

```

atg cgg att ctg gtc acc ggc gga gcc ggt ttc atc ggc tcg cac tac 48
Met Arg Ile Leu Val Thr Gly Gly Ala Gly Phe Ile Gly Ser His Tyr
  1             5             10             15

```

gtt cgg cag ttg ctc ggt ggt gcg tac ccc gca ttc gcc gac gcc gac	96
Val Arg Gln Leu Leu Gly Gly Ala Tyr Pro Ala Phe Ala Asp Ala Asp	
20 25 30	
gtg gtc gtg ctc gac aag ctc acc tac gcc ggc aac gag gcg aac ctg	144
Val Val Val Leu Asp Lys Leu Thr Tyr Ala Gly Asn Glu Ala Asn Leu	
35 40 45	
gcg ccg gtc gcg gac aac ccc cgg ctg aag ttc gtc tgc ggc gac atc	192
Ala Pro Val Ala Asp Asn Pro Arg Leu Lys Phe Val Cys Gly Asp Ile	
50 55 60	
tgc gac cgc gaa ctg gtt ggc ggc ctg atg tcc ggc gtg gac gtg gtg	240
Cys Asp Arg Glu Leu Val Gly Gly Leu Met Ser Gly Val Asp Val Val	
65 70 75 80	
gtg cac ttc gcc gcc gaa acc cac gtc gac cgc tcg atc acc ggc tcg	288
Val His Phe Ala Ala Glu Thr His Val Asp Arg Ser Ile Thr Gly Ser	
85 90 95	
gac gcc ttc gtg atc acc aac gtg gtc ggc acc aac gtg ctg ctg cag	336
Asp Ala Phe Val Ile Thr Asn Val Val Gly Thr Asn Val Leu Leu Gln	
100 105 110	
gcc gcg ctc gac gcc gag atc ggc aag ttc gtg cac gtt tcc acc gac	384
Ala Ala Leu Asp Ala Glu Ile Gly Lys Phe Val His Val Ser Thr Asp	
115 120 125	
gag gtc tac ggc tcc atc gag gac ggc tcg tgg ccc gaa gac cac gcg	432
Glu Val Tyr Gly Ser Ile Glu Asp Gly Ser Trp Pro Glu Asp His Ala	
130 135 140	
ctg gag cgg aat tcc ccg tac tcg gcg gcg aaa gcg ggc tcg gac ctg	480
Leu Glu Pro Asn Ser Pro Tyr Ser Ala Ala Lys Ala Gly Ser Asp Leu	
145 150 155 160	
ctg gcc cgc gcc tac cac cgc acc cac gga ctg ccg gtg tgc atc acc	528
Leu Ala Arg Ala Tyr His Arg Thr His Gly Leu Pro Val Cys Ile Thr	
165 170 175	
cgc tgc tcc aac aac tac ggg ccc tac cag ttc ccg gag aag gtg ctg	576
Arg Cys Ser Asn Asn Tyr Gly Pro Tyr Gln Phe Pro Glu Lys Val Leu	
180 185 190	
ccg ctg ttc atc acg aac ctg atg gac ggc agc cag gtg ccg ctc tac	624
Pro Leu Phe Ile Thr Asn Leu Met Asp Gly Ser Gln Val Pro Leu Tyr	
195 200 205	
ggc gac ggg ctc aac gtg cgg gac tgg ctg cac gtc agc gac cac tgc	672
Gly Asp Gly Leu Asn Val Arg Asp Trp Leu His Val Ser Asp His Cys	
210 215 220	
cgg ggc atc cag ctg gtg gcc gac tcc ggg cgc gcg ggc gag atc tac	720
Arg Gly Ile Gln Leu Val Ala Asp Ser Gly Arg Ala Gly Glu Ile Tyr	
225 230 235 240	
aac atc ggc ggc ggc acc gag ctg acc aac aac gag ctg acc gag cgg	768

Asn Ile Gly Gly Gly Thr Glu Leu Thr	Asn Asn Glu Leu Thr Glu Arg	
245	250	255
ctg ctg gca gag ctg ggc ctc gac tgg tcg gtg gtg cgg ccg gtc acc	816	
Leu Leu Ala Glu Leu Gly Leu Asp Trp Ser Val Val Arg Pro Val Thr		
260	265	270
gac cgc aag ggc cac gac cgc cgc tac tcg gtg gac cac agc aag atc	864	
Asp Arg Lys Gly His Asp Arg Arg Tyr Ser Val Asp His Ser Lys Ile		
275	280	285
gtc gag gaa ctg ggg tac gcg ccg cag gtc gac ttc gag acc ggg ctg	912	
Val Glu Glu Leu Gly Tyr Ala Pro Gln Val Asp Phe Glu Thr Gly Leu		
290	295	300
cgc gag aca atc cgc tgg tac cag gac aac cgg gac tgg tgg gag ccg	960	
Arg Glu Thr Ile Arg Trp Tyr Gln Asp Asn Arg Asp Trp Trp Glu Pro		
305	310	315
ctg aag gcc cga tcg gcg gtg gct cga tga	990	
Leu Lys Ala Arg Ser Ala Val Ala Arg		
325		

<210> 53
 <211> 329
 <212> PRT
 <213> Saccharopolyspora spinosa

Met Arg Ile Leu Val Thr Gly Gly Ala Gly Phe Ile Gly Ser His Tyr	
1 5 10 15	
Val Arg Gln Leu Leu Gly Gly Ala Tyr Pro Ala Phe Ala Asp Ala Asp	
20 25 30	
Val Val Val Leu Asp Lys Leu Thr Tyr Ala Gly Asn Glu Ala Asn Leu	
35 40 45	
Ala Pro Val Ala Asp Asn Pro Arg Leu Lys Phe Val Cys Gly Asp Ile	
50 55 60	
Cys Asp Arg Glu Leu Val Gly Gly Leu Met Ser Gly Val Asp Val Val	
65 70 75 80	
Val His Phe Ala Ala Glu Thr His Val Asp Arg Ser Ile Thr Gly Ser	
85 90 95	
Asp Ala Phe Val Ile Thr Asn Val Val Gly Thr Asn Val Leu Leu Gln	
100 105 110	
Ala Ala Leu Asp Ala Glu Ile Gly Lys Phe Val His Val Ser Thr Asp	
115 120 125	
Glu Val Tyr Gly Ser Ile Glu Asp Gly Ser Trp Pro Glu Asp His Ala	
130 135 140	

Leu Glu Pro Asn Ser Pro Tyr Ser Ala Ala Lys Ala Gly Ser Asp Leu
 145 150 155 160
 Leu Ala Arg Ala Tyr His Arg Thr His Gly Leu Pro Val Cys Ile Thr
 165 170 175
 Arg Cys Ser Asn Asn Tyr Gly Pro Tyr Gln Phe Pro Glu Lys Val Leu
 180 185 190
 Pro Leu Phe Ile Thr Asn Leu Met Asp Gly Ser Gln Val Pro Leu Tyr
 195 200 205
 Gly Asp Gly Leu Asn Val Arg Asp Trp Leu His Val Ser Asp His Cys
 210 215 220
 Arg Gly Ile Gln Leu Val Ala Asp Ser Gly Arg Ala Gly Glu Ile Tyr
 225 230 235 240
 Asn Ile Gly Gly Gly Thr Glu Leu Thr Asn Asn Glu Leu Thr Glu Arg
 245 250 255
 Leu Leu Ala Glu Leu Gly Leu Asp Trp Ser Val Val Arg Pro Val Thr
 260 265 270
 Asp Arg Lys Gly His Asp Arg Arg Tyr Ser Val Asp His Ser Lys Ile
 275 280 285
 Val Glu Glu Leu Gly Tyr Ala Pro Gln Val Asp Phe Glu Thr Gly Leu
 290 295 300
 Arg Glu Thr Ile Arg Trp Tyr Gln Asp Asn Arg Asp Trp Trp Glu Pro
 305 310 315 320
 Leu Lys Ala Arg Ser Ala Val Ala Arg
 325

<210> 54
 <211> 918
 <212> DNA
 <213> Saccharopolyspora spinosa

<220>
 <221> CDS
 <222> (1)..(915)
 <223> ORF24; dNDP-4-keto-6-deoxyglucose-3,5-epimerase

<400> 54
 atg agt cgc ctc gcc gtg ctg gtg ccc ggc ggc cgc ggc cag ctg ggc 48
 Met Ser Arg Leu Ala Val Leu Val Pro Gly Gly Arg Gly Gln Leu Gly
 1 5 10 15
 tcg gag ctg gcc cgg atc ctc ccc gcg cgg acg ggg gcg ctg gtg cac 96
 Ser Glu Leu Ala Arg Ile Leu Pro Ala Arg Thr Gly Ala Leu Val His
 20 25 30

cgg ccg ggt tcc ggg gaa ctg gac gtc acc gac gcc gag gag gtc gcc Arg Pro Gly Ser Gly Glu Leu Asp Val Thr Asp Ala Glu Glu Val Ala 35 40 45	144
gac gcg ttg ggt tcc ttc gcg gag acg gcg aag gac gcg gag ctg cga Asp Ala Leu Gly Ser Phe Ala Glu Thr Ala Lys Asp Ala Glu Leu Arg 50 55 60	192
ccg gtg gtg atc aac gcc gcg gcg tac acg gcg gtg gac gcg gcc gag Pro Val Val Ile Asn Ala Ala Ala Tyr Thr Ala Val Asp Ala Ala Glu 65 70 75 80	240
tcc gac ccg gac cgc gcg gcc cgg atc aac gcc gaa ggc gcg gcc tcg Ser Asp Pro Asp Arg Ala Ala Arg Ile Asn Ala Glu Gly Ala Ala Ser 85 90 95	288
ctg gcg aaa gcg tgc cgg agc agc ggt ctg ccc ctg gtg cac gtg tcg Leu Ala Lys Ala Cys Arg Ser Ser Gly Leu Pro Leu Val His Val Ser 100 105 110	336
acg gat tac gtg ttc ccc ggt gat ggg gcc cgg ccg tac gag ccg acg Thr Asp Tyr Val Phe Pro Gly Asp Gly Ala Arg Pro Tyr Glu Pro Thr 115 120 125	384
gac ccg acc ggg ccg cga tcg gtc tac ggg cgc acc aag ctc gaa ggc Asp Pro Thr Gly Pro Arg Ser Val Tyr Gly Arg Thr Lys Leu Glu Gly 130 135 140	432
gaa ccg gcc gtg ctg gag tcc ggc gcg cgg gcc tgg gtg gtg cgc acg Glu Arg Ala Val Leu Glu Ser Gly Ala Arg Ala Trp Val Val Arg Thr 145 150 155 160	480
gca tgg gtg tac ggc gcg agc ggc aag aac ttc ctg aaa acg atg atc Ala Trp Val Tyr Gly Ala Ser Gly Lys Asn Phe Leu Lys Thr Met Ile 165 170 175	528
cgc ctc tcg ggg gag cgc gac acg ctg tcc gtt gtg gac gat cag atc Arg Leu Ser Gly Glu Arg Asp Thr Leu Ser Val Val Asp Asp Gln Ile 180 185 190	576
ggc tcg ccg act tgg gcg gcg gac ctg gcg agc ggc ctg ctg gag ctg Gly Ser Pro Thr Trp Ala Ala Asp Leu Ala Ser Gly Leu Leu Glu Leu 195 200 205	624
gcc gaa ccg gtc gcc gaa cgc cgt gga ccg gag cag aag gtg ctg cac Ala Glu Arg Val Ala Glu Arg Arg Gly Pro Glu Gln Lys Val Leu His 210 215 220	672
tgc acc aat tcc ggc cag gtg acc tgg tac gag ttc gcg cgg gcg atc Cys Thr Asn Ser Gly Gln Val Thr Trp Tyr Glu Phe Ala Arg Ala Ile 225 230 235 240	720
ttc gcg gaa ttc ggc ctg gac gag aac cgc gtc cac ccg tgc acg acg Phe Ala Glu Phe Gly Leu Asp Glu Asn Arg Val His Pro Cys Thr Thr 245 250 255	768
gcg gac ttc ccc ctc ccg gcg cac cgc ccg gcc tac tcg gtc ctg tcc	816

Ala Asp Phe Pro Leu Pro Ala His Arg Pro Ala Tyr Ser Val Leu Ser
 260 265 270

gac gtg gcg tgg cga gag gcg ggc ctg acc ccg atg cgc acc tgg cgg 864
 Asp Val Ala Trp Arg Glu Ala Gly Leu Thr Pro Met Arg Thr Trp Arg
 275 280 285

gaa gcc ctg gcg gcg gcc ttc gag aaa gac ggc gaa acc ctc cga acc 912
 Glu Ala Leu Ala Ala Ala Phe Glu Lys Asp Gly Glu Thr Leu Arg Thr
 290 295 300

cgc tga 918
 Arg
 305

<210> 55
 <211> 305
 <212> PRT
 <213> Saccharopolyspora spinosa

<400> 55
 Met Ser Arg Leu Ala Val Leu Val Pro Gly Gly Arg Gly Gln Leu Gly
 1 5 10 15

Ser Glu Leu Ala Arg Ile Leu Pro Ala Arg Thr Gly Ala Leu Val His
 20 25 30

Arg Pro Gly Ser Gly Glu Leu Asp Val Thr Asp Ala Glu Glu Val Ala
 35 40 45

Asp Ala Leu Gly Ser Phe Ala Glu Thr Ala Lys Asp Ala Glu Leu Arg
 50 55 60

Pro Val Val Ile Asn Ala Ala Ala Tyr Thr Ala Val Asp Ala Ala Glu
 65 70 75 80

Ser Asp Pro Asp Arg Ala Ala Arg Ile Asn Ala Glu Gly Ala Ala Ser
 85 90 95

Leu Ala Lys Ala Cys Arg Ser Ser Gly Leu Pro Leu Val His Val Ser
 100 105 110

Thr Asp Tyr Val Phe Pro Gly Asp Gly Ala Arg Pro Tyr Glu Pro Thr
 115 120 125

Asp Pro Thr Gly Pro Arg Ser Val Tyr Gly Arg Thr Lys Leu Glu Gly
 130 135 140

Glu Arg Ala Val Leu Glu Ser Gly Ala Arg Ala Trp Val Val Arg Thr
 145 150 155 160

Ala Trp Val Tyr Gly Ala Ser Gly Lys Asn Phe Leu Lys Thr Met Ile
 165 170 175

Arg Leu Ser Gly Glu Arg Asp Thr Leu Ser Val Val Asp Asp Gln Ile
 180 185 190

Gly Ser Pro Thr Trp Ala Ala Asp Leu Ala Ser Gly Leu Leu Glu Leu
195 200 205

Ala Glu Arg Val Ala Glu Arg Arg Gly Pro Glu Gln Lys Val Leu His
210 215 220

Cys Thr Asn Ser Gly Gln Val Thr Trp Tyr Glu Phe Ala Arg Ala Ile
225 230 235 240

Phe Ala Glu Phe Gly Leu Asp Glu Asn Arg Val His Pro Cys Thr Thr
245 250 255

Ala Asp Phe Pro Leu Pro Ala His Arg Pro Ala Tyr Ser Val Leu Ser
260 265 270

Asp Val Ala Trp Arg Glu Ala Gly Leu Thr Pro Met Arg Thr Trp Arg
275 280 285

Glu Ala Leu Ala Ala Ala Phe Glu Lys Asp Gly Glu Thr Leu Arg Thr
290 295 300

Arg
305